The Story of Mount Washington

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REYNOLDS HISTORICAL
GENEALOGY COLLECTION

Mount Washington country

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Littleton

Suc R.

Montpelier

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Franconia

Mt. Hale

Mt. Garfield

Wells River

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Lincoln

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Connecticut River

Hanover

Plymouth

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Boundary of White Mountain National Forest

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Berlin

Gorham

ANDROSCOGGIN RIVER

Bethel

Mt. Adams

Mt. Madison

Jefferson

Mount Washington

Carter Dome

Mt. Franklin

Mt. Monroe

Mt. Clinton

Mt. Jackson

Mt. Willey

Mt. Crawford

North Conway

Carrigain

Bear Mt.

Long Lake

Chocorua

Conway

Conway Lake

Sebago

SACO RIVER

Ossipee Lake

Squam Lake

The Story of Mount Washington

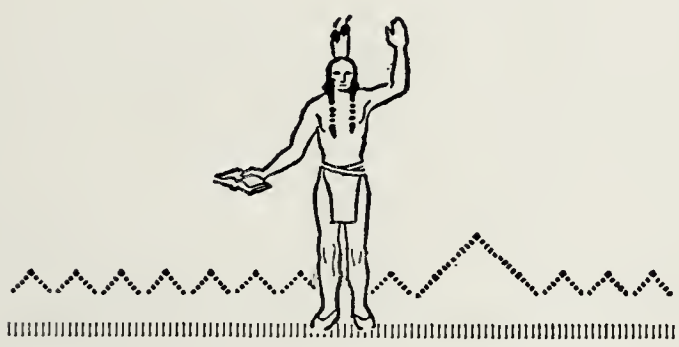
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THE STORY OF

Mount Washington

BY F. ALLEN BURT



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1960

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To My Wife

1973801

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Preface

IN 1877 my grandfather Henry M. Burt started on the summit of Mount Washington the publication of the only newspaper ever printed on a mountain top—*Among the Clouds*. When he died twenty years later my father Frank H. Burt became publisher of this unique summer daily until the fire of 1908 destroyed the printing office along with all the summit buildings except the Tiptop House.

At Frank's death in 1946 he left a great amount of material collected as a basis for writing a history of Mount Washington. As his son, I felt an urge to mold these valuable data into a volume that would be authoritative as history and at the same time interesting to the casual reader. For while Mount Washington has become a center of scientific research, it is also the goal of thousands of visitors each year who come purely for pleasure.

I am grateful to many friends who have aided me with information and counsel in the preparation of this book. My thanks go especially to Robert S. Monahan, Professor Wheaton A. Holden, Mrs. Elizabeth G. Humez, Arthur S. Teague, Dr. Marland P. Billings, and Carmen Onofrio. Special credit should be given to Miss Virginia L. Close of the Dartmouth College Library for her work in preparing a full and excellent index.

For illustrative material I am indebted especially to Winston Pote, Guy Shorey, Harold Orne, Harold S. Walker, The Knoedler Galleries, Bradford Washburn, Gardner Campbell, Louis F. Fowler, *Trains*, Sikorsky Aircraft, and the various services under the Department of Defense. Credit for use of printed material goes to J. B. Lippincott Company, Houghton Mifflin Company, The Beacon Press, and the *Saturday Evening Post*.

Brookline, Massachusetts
1 December 1959

F. ALLEN BURT

PART I

The Mountain as Enemy

1. Mount Washington is Like This

THERE is a tradition that when Phineas Taylor Barnum stood on top of the old observation tower on Mount Washington, his gaze sweeping the thousand-mile horizon from the Canadian border to the Atlantic Ocean, he said, "This is the second greatest show on earth!"

At his feet the gray, rock-strewn cone of the mountain fell away, to end abruptly in great ravines and gulfs. Beyond the narrow valleys rose lesser mountains, forest-topped, and hills dark green with spruce and balsam fir. As far as his eye could reach, the great showman saw unbroken forests, rolling farm lands, serpentine rivers that criss-crossed the North Country, myriad lakes glinting like jewels in their settings of woodland and meadow, and, a hundred miles to the east, a silver thread of ocean. The fascination Mount Washington had for P. T. Barnum has captured countless other visitors before and since.

Of course Mount Washington is not high as compared to scores of peaks in our own West and in many other countries. Yet its height and ruggedness pose a challenge to the climber, while its unusualness —an arctic island in the temperate zone—forms one of the lures that bring 50,000 or more visitors to the summit every year.

Many of these visitors pause along the way to taste the delights of a New Hampshire vacation, though many others come solely to climb, to ski, or to ascend the mountain in other ways. New Hampshire as a vacation land is known at home and abroad: its lakes and streams, its hills and valleys, its lovely summer days and superb sunsets, its riot of fall colors, and its crisp skiing weather when all is white and green —all of these are part of the appeal of the North Country. And at the very center of activity, and accessible to any city of the Northeast is Mount Washington.

Compared to the great Western mountains, Mount Washington seems a dwarf. As the editor of the *Pike's Peak News* remarked with a chuckle when told that I came from *Among the Clouds*, the summer newspaper then printed daily on the summit of Mount Washington: "Yes, but we are higher at Manitou at the foot of our mountain than you are on top of yours! Furthermore, if we were on the summit we couldn't get up steam pressure enough to run the press."

Had I then known more about geology I might have replied: "True, but our mountain was a very old man before yours was even born!" For Mount Washington is one of the world's oldest mountains, some 260 million years older than the coastal ranges of the Far West. Fifty thousand years ago its summit, with all of New England, was covered by the Wisconsin ice cap, the fourth glacial stage of the Ice Age. Pebbles brought by the ice from the Starr King Range in Jefferson, New Hampshire, eight miles or more to the north, have been found on the very top of Mount Washington.

Mount Washington is the center and summit of the White Mountains of New Hampshire. Rising 6288 feet above the sea and some 4000 feet above its bases at the east and west, the treeless, rock-strewn summit forms a symmetrical apex for the backbone of the mountain region known as the Presidential Range.

The highest peak in New England is also one of the loftiest in the United States east of the Mississippi River. Only Mount Mitchell in North Carolina and a few of its neighboring peaks top the altitude of Mount Washington.

Yet height alone is not the factor that governs the mountain's popularity among hikers, campers, skiers, callers by horse, by wagon, by auto, by train, by dog sled, and even by helicopter. For a hundred and fifty years scientists have studied its geology, its evidences of glacial action, its vegetation and wild life. Other observers have risked their lives to dwell on the summit the year round to study its winds and weather. Ever since the start of World War II the mountain has been used as an experimental laboratory where Army, Navy, and Air Force equipment, food, and clothing are tested under what have been called the most severe weather conditions in the world. Experiments relating to the control of icing on the wings of airplanes and in jet engines have been going on for two decades on this exposed peak, where frost and ice can form at any time during the year.

Those who love Mount Washington are proud of its many records. In 1642 it was one of the world's first great mountains to be climbed.[1]



Drawing of Mount Washington and Southern Peaks by Isaac Sprague for Oakes' *White Mountain Scenery*.



Summit of Mount Washington from Sikorsky s–51 helicopter 15 July 1948. Mount Jefferson is behind the Tiptop House.

In 1819, when Abel and Ethan Allen Crawford cut out the first path from the Notch to the summit, Mount Washington became the birthplace of American mountain climbing. It was the first and only mountain to own a carriage road and a railway, a commodious hotel, a daily newspaper, a telegraph office and telephone service, a weather bureau and an important research laboratory for the armed services, a completely equipped FM radio station, and a commercially operated television station.

How did Mount Washington happen to be? Was it thrust up through a fault in the earth's crust, all complete with shoulders, spurs, ravines, and peak? Or was it put together in layers like a wedding cake, and then, through the erosive power of frost and ice and swirling streams, and the final gouging and polishing of glacial action, molded into its present size and shape?

If we prefer the first theory, there is this ancient Indian legend:

Cold storms were in the northern wilderness, and a lone red hunter wandered without food, chilled by the frozen wind. He lost his strength, and could find no game; and the dark cloud that covered his life-path made him weary of wandering. He fell down upon the snow, and a dream carried him to a wide happy valley, filled with musical streams, where singing-birds and game were plenty. His spirit cried aloud for joy; and the "Great Master of Life" waked him from his sleep, gave him a dry coal and a flint-pointed spear, telling him that by the shore of the lake he might live, and find fish with his spear, and fire from his dry coal. One night, when he had laid down his coal, and seen a warm fire spring up therefrom, with a blinding smoke, a loud voice came out of the flame, and a great noise, like thunder, filled the air; and there rose up a vast pile of broken rocks. Out of the cloud resting upon the top came numerous streams, dancing down, foaming cold; and the voice spake to the astonished red hunter, saying, "*Here the Great Spirit will dwell, and watch over his favorite children!*"[2]

But if we question modern geologists, we shall find that the layer-cake idea, in somewhat complicated form, is more nearly accurate. We must go back many millions of years to the birthday of old Agiocochook, as the Indians called Mount Washington. In fact, the first layer of our cake was poured into the pan some 400 million years ago, making Mount Washington one of the most venerable mountains in the world.

So slow and so tremendous was the labor of putting together the layers of sand, mud, rock, and volcanic debris; of altering them to stone through pressure and heating and folding; and of whittling

away all the loose material until nothing was left that could be moved or worn down, that Mount Washington did not actually emerge in its own well-known likeness till some two million years ago.

Although white men have known and have studied Mount Washington for 300 years, yet as late as 1844, after a visit to the summit, Dr. Charles T. Jackson, first State Geologist of New Hampshire, reported: "The geological features of Mount Washington possess but little interest."[3]

But the instant a person climbs above timber line, he knows that Mount Washington is interesting. As far as the eye can reach is nothing but tumbled masses of broken rock, or talus, with vegetation shriveled to clumps of sparse grasses and an occasional stunted shrub. He is in a new world as different from the world left behind in the valley as day is from night. Everything is different: soil, animal and insect life, flowers, and climate. Even the wind sweeps past with a different sound, a deeper cadence or a shriller whistle. Temperatures may vary fifty degrees from sun to shadow. In all respects the cone of Mount Washington is an arctic outpost in the midst of civilization.

"Tough" is a word often heard among hikers. And "tough" is a word that fits Mount Washington. For the rugged old peak has weathered millions of years of wearing by frost and water, and grinding and gouging by glaciers. And still it stands, for it is not made principally of granite, a stone that is rather easily broken down and eroded, but of a tough schist which can take punishment through the ages without showing appreciable wear. The often-used term "Granite Hills" is not accurate.

It was not until Dr. Charles H. Hitchcock of Dartmouth College, with his party of scientists, spent the winter of 1870–71 on the summit, that Mount Washington became the subject of modern scientific study, and evidence of glacial action on the summit itself was discovered.[4] More recent and far more extensive studies by Dr. Ernst Antevs,[5] Dr. Marland P. Billings[6] of Harvard, Dr. Richard P. Goldthwait of Ohio State University, and others, have traced the story of Mount Washington in rocks and folds and cirques and in glacial deposits of boulders back through the ages to an era about 375 million years ago.

At that time central New Hampshire was covered by a great inland sea. Its eastern shore was far to the east, probably somewhere in the present Gulf of Maine. Still farther to the east lay land, stretching far out into what is now the Atlantic Ocean. Streams flowing westward, constantly attacking this land, carried a continuous flow of tiny parti-

cles of sand and clay to the inland sea. Slowly, and over countless eons, vast quantities of sand and mud were deposited in the New Hampshire sea.

Geologists tell us that the first deposits of which we have any record in the Mount Washington region were composed chiefly of sand. At first the individual layers were only a few inches or, at most, a few feet thick, but eventually the sheet of sand accumulated to a depth of many thousands of feet. The sea was never very deep, and as the sands were laid down, the bottom gradually sank. These deposits have now been altered to gray quartzites, and make up what is called the Albee formation, dating back to Ordovician times, perhaps 415 million years ago.

To the east of the Mount Washington region, which at that remote era was merely a flat plain, lay volcanoes. Nothing remains of those volcanoes, but for a time they were intensely active. Vast quantities of volcanic debris were carried westward by the streams. Sometimes deposits of volcanic ash dropped directly from the air, and occasionally lava flows invaded the area of which Mount Washington is now the center. It seems probable that throughout most of the time of this volcanic activity the New Hampshire sea was completely filled up by the volcanic deposits which formed a great sheet 5000 feet thick. This elevated plain stretched far out toward the eastern mountains—which later disappeared beneath the Atlantic Ocean—so that streams flowed from them directly over the Mount Washington region.

For millions of years the Mount Washington region continued to be dry land, still in the form of a great plain. Then followed the Devonian period, about 330 million years ago, when wide seas again covered most of New Hampshire. During many hundreds of thousands of years thousands of feet of alternating layers of mud, sand, and a little impure limestone were laid down. The whole Presidential Range is made up of, and carved out from, these deposits. This formation was from 4000 to 5000 feet thick. The upper part of it makes up the bulk of the bedrock of most of the higher summits of the Presidential Range. It has been changed from sand and mud into interbedded quartzite and mica schist. It is this mica that has given Mount Washington the whitish appearance that is supposed to have given rise, at least in part, to the term "White Hills."

Now that the rock bed, thousands of feet thick, had been laid down, molten rock intruded below to produce humps or domes in the vast plain; and faulting and folding provided huge irregular masses of

rock ready for the hand of the great sculptor—erosion. Here were thousands of feet of rock that had to be broken down by active streams, aided by the action of frost, and carried away bit by bit to the distant seas. After some 200 million years of erosion, the area became a rolling plain not much above sea level, from which rose hills a few hundred feet high. This plain may be called the Presidential upland. Traces of it are still found high up on the shoulders of the tallest peaks where great flat stretches form the Alpine Garden and Bigelow Lawn on Mount Washington and the course of the Gulfside trail.

During a period of more than a million years, this plain or upland was raised to its present 5000-foot altitude, with the peaks of the Presidential Range retaining their form as rounded hills and rising above it. Streams developed on the mountain sides, cutting steep V-shaped valleys in the lower slopes. Now the streams came tumbling and cascading down into the broad valleys below, and the whole area came to resemble what it is today.

Next came the ice age, when the mountains would be still further molded and modified to the shape we now know. In all, there were four glacial stages that affected the north central United States. But only the last of these, the Wisconsin stage, has left clear proof of its action on Mount Washington. The Wisconsin stage started in Canada some 50,000 years ago. Many thousands of feet thick, this ice cap moved southward, covering all of New England. Everywhere it passed, rock ledges were scoured clean, hills were rounded, and valleys were deepened.

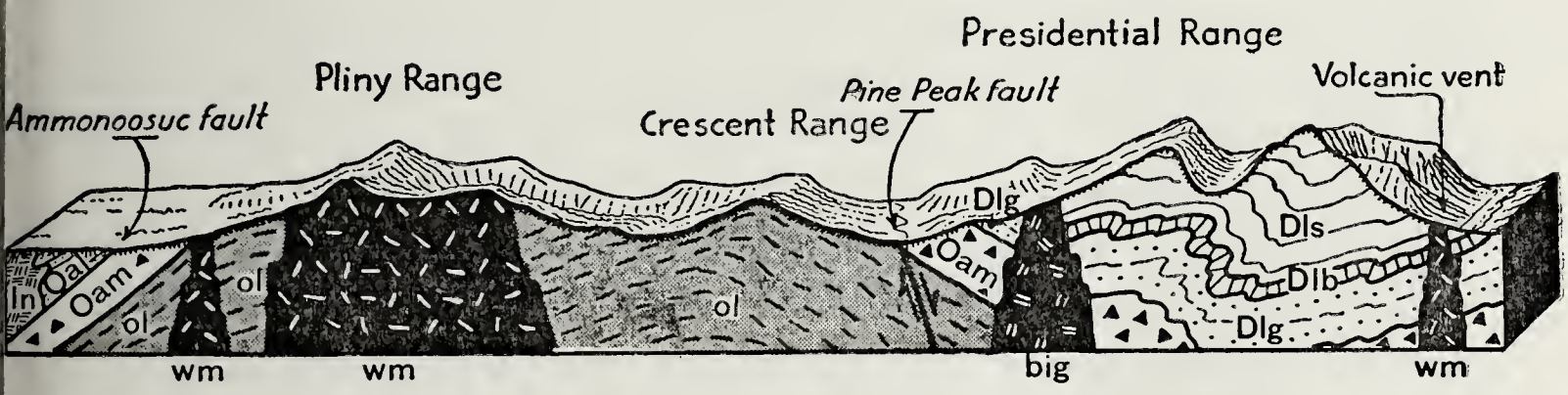
During this stage glacial tongues flowed down the mountainsides, widening the valleys, and cutting out great amphitheater-like ravines, called "cirques." Such cirques are Tuckerman and Huntington ravines and the Great Gulf. These are strikingly different from the steep V-shaped canyons on the west of Mount Washington, where the mountain glaciers did not form. This was because the prevailing southwesterly winds blew the snow over the mountains to accumulate on the east and northern slopes, just as it does today, filling Tuckerman Ravine with great depths of snow.

Further evidence that the ice sheet covered the summit has been found in the pockets of till—clay-like soil with angular fragments of rock brought from a distance—that were discovered in excavations for the foundations of buildings on the top of Mount Washington.[7] Some of these deposits of till were as much as six feet in depth and were found under great accumulations of heavy boulders.

How long did it take the ice sheet to melt? According to this story from the ancient *Cornhill Magazine*[8] some of that ice never melted:

In some parts of New Hampshire, where the glaciers were unusually thick and deep, fragments of the primeval ice itself still remain on the spots where they were originally stranded. Among the shady glens of the White Mountains there occur here and there great masses of ancient ice, the unmelted remnant of primeval glaciers, and one of these is so large that an artificial cave has been cleverly excavated in it, as an attraction for tourists, by the canny Yankee proprietor.

For more than 300 years the Great White Hills have been visited by countless thousands. They have been the goal of scientists, of pioneers, of settlers, of loggers, and other exploiters. And Mount Washington, as the center and topmost peak of the White Mountains, has drawn to itself myriads of vacation-makers, hikers, and skiers from every state in the Union.



This diagram illustrates how the various layers of sands (Oal=Albee formation), volcanic rocks (Oam=Ammonoosuc volcanics), molten rock (In=Lost Nation group), and sand, mud and a little impure limestone (Dlg, Dlb, Dls=Littleton formation) were pushed up into great humps by molten rock (ol=Oliverian magma series); then changed by invasion of more molten rock (big=Bickford granite of the New Hampshire magma series, and wm=White Mountain magma series); and finally eroded to present topography. *Geology of Mt. Washington Quadrangle* (see p. 253, n. 5), pp. 12, 13 (courtesy of New Hampshire State Planning and Development Commission).

2. The Pioneers

PROBABLY the first white men ever to see the White Mountains were the two Cabots, John and Sebastian, who coasted along the shores of Maine and New Hampshire in 1497–98. Certainly the first white man to climb Mount Washington was Darby Field, who, according to the record left by Governor John Winthrop of the Massachusetts Bay Colony, made two ascents in 1642, the first in June.

Because of the hostility of Indian tribes, few settlements were made north of Portsmouth, New Hampshire, until after the mid 1700s. Indians believed that Mount Washington was the abode of the Great Spirit, and that climbing to its summit would bring death to the invader. When Field made his exploration from his home in Exeter, New Hampshire, to the White Mountains, he found only two of his Indian guides willing to accompany him to the summit of Agiocochook (or Agiochook), the ancient Indian name for Mount Washington.[1] About a month later he made a second ascent in company with five or six other men. Governor Winthrop's account of the trip[2] is given in such detail that Field's exact route can be fairly well traced.

Dr. Jacob Bigelow, the famous botanist, after his own ascent in 1816, wrote: "The relation of Darby Field may be considered as in the main correct, after making reasonable deductions for the distance, length of Muscovy glass [mica, which Field reported he found in sheets forty feet long and seven or eight broad], and the quantity of water in view, which it may be suspected has not been seen by any visitor since his time."[3]

Later in the year of Darby Field's visits, another party, including Thomas Gorges, deputy governor, and Richard Vines, councillor of

the Province of Maine, climbed the mountain. According to Winthrop they went up the Saco River in birch canoes some ninety miles to "Pegwaggett, an Indian town" (in the Conway region).

Interpreting these accounts of the Field and Gorges ascents, Professor Edward Tuckerman of Amherst College, for whom Tuckerman Ravine was named, concluded that both parties followed the valley of the Ellis River, and left it for the great southeastern ridge of Mount Washington, which is now called Boott Spur. After struggling through the region of dwarf firs at timber line, and crossing a bald region, Field was surprised with the "first view of the peak of Mount Washington, as a pretty regular pyramid, in what appeared a plain," which is just the way it struck Gorges, and also John Josselyn[4]—the latter an Englist naturalist who climbed the mountain.[5]

One of the few ascents of Mount Washington during the eighteenth century was chronicled by the Reverend Jeremy Belknap, who told of an ascent of "the highest mountain, on the N.W. part," by "a ranging company," 29 April 1725.[6] They found the summit covered with white frost and ice, and snow to a depth of four feet on the northwest side. This appears to have been the first ascent on that side of the mountain.

During the next forty or fifty years there seems to have been no further activity on or near Mount Washington. In 1763 the Royal Governor, Benning Wentworth, made a grant of land in the region known as the Upper Coos, in the fertile meadows bordering the Connecticut River, which resulted in the founding of the town of Lancaster, in a few years to become a prosperous farming and lumbering center.

But for several years after its settlement, there was no short cut from the town to the seaboard, where the products of farm and forest might be exchanged for manufactured goods and supplies, of which one of the most important was salt. The White Mountain Notch, later to be known as Crawford Notch, had apparently not yet been discovered by the whites, although for years the Indians had a trail through its rocky course by which they could pass from Pigwacket to the Coos. So great was the fear of the red men for Agiochook and the demons said to inhabit its dread summit that it is likely this trip was seldom made and that the existence of the trail was known to few, if any, white explorers.

It was not until 1771 that Timothy Nash, a hunter from Lancaster, came upon it by chance. All the chronicles agree that he was tracking a moose over Cherry Mountain. *The History of Lancaster*[7] says the

moose disappeared into the Notch, leading Nash to the discovery. Other chroniclers say Nash climbed a tree high on the mountain to get his bearings. Off to the east, to his surprise, the wall of mountains seemed to open. He slid down the tree and, with the unerring instinct of the woodsman, made a beeline for the gateway to the Notch. To his amazement, he found that this was the beginning of a long and rugged defile between what is now Mount Webster at the southerly end of the Presidential Range, at his left, and Mount Willard and the Field-Willey Range at his right.

Struggling alone down the Notch, Nash sought the Royal Governor, Sir John Wentworth,[8] at Portsmouth, and told of his discovery.

"Bring a horse down the pass," said the Governor, "and show me that it will be a practicable route for the settlers, and you shall have a grant of land."

Nash and his friend Benjamin Sawyer dragged a horse down the gorge over boulders and fallen logs and through rushing streams, to the great discomfort of the unfortunate animal. Their reward was a tract of 2184 acres, granted by the Governor and Council 20 May 1773, bounding on Bretton Woods, and recorded on the maps as "Nash and Sawyer's Location." This "Location" was surveyed by Edwards Bucknam, known as the "most universal genius" of Lancaster, which he helped to settle in 1764.

Timothy Nash visited his old home in Shutesbury, Massachusetts, in 1772, and was married to Mary Powers. Soon after he and Sawyer had received their land grant they sold it to James Richardson of Leominster, Massachusetts, for £90. A year later Richardson sold it for £100. Within the bounds of this grant have been built the Crawford, Fabyan, and Mount Pleasant Houses and the Mount Washington Hotel. The tract now forms a part of the town of Carroll.

Almost immediately after Timothy Nash had discovered the Notch, men of vision saw the commercial value of the broad valley to the west of the Presidential Range, through which travelers would have to pass in the coming traffic between the North Country of New Hampshire and the seaboard towns, principally Portsmouth. So swiftly did they act to get in on the ground floor of any possible land boom, that, before Nash and his partner Sawyer were deeded their grant of land as a reward for discovering the Notch, a group of eighty-three received a grant of Bretton Woods (now a part of the town of Carroll).[9]

Before the first road through the Notch was constructed two brave women came to Jefferson by the primitive trail to serve as housekeep-

ers for Colonel Joseph Whipple, owner of the new settlement. Each gained a permanent place in White Mountain History—Nancy,[10] because of her tragic death; and Deborah Vicker, later Mrs. Richard Stalbird, best known as "Granny Stalbird," for her self-sacrifice and devotion in saving the lives of others.

Tricked into entrusting her savings to a man to whom she was to be married, Nancy found that he had gone toward Portsmouth with Whipple. Starting in pursuit late in the afternoon, Nancy made her desperate way through deep snow along the rough trail into the Notch. Twenty-two miles from Jefferson her frozen body was found the next day. She is remembered by Nancy's Brook, flowing from Mount Nancy and crossed just south of Notchland by Nancy's Bridge.

Among White Mountain pioneers, many days' journey from trained medical or nursing care, Granny Stalbird's fame as "doctress" became well known. From the Indians she learned the use of roots and herbs of more or less curative value. This knowledge, combined with a native gift for nursing, brought comfort and health to many homes.

In 1784 there came to Mount Washington the first deliberately selected group of scientists ever to visit the White Mountains. Their purposes were to study the bird, animal, and plant life of the mountains, to ascertain the altitude of the highest peak, and to gather any further astronomical, geological, or other scientific facts that might come to their attention.

Leader of the party was the Reverend Jeremy Belknap, D.D.,[11] a resident of Dover, New Hampshire, who was then writing his *History of New Hampshire*. The discoveries made on this trip are set down in his third volume, in which he modestly states: "A company of gentlemen visited these mountains in July, 1784."[12] He makes no mention of his participation in the expedition, which was unknown until his personal journal of the trip was printed.[13]

With Dr. Belknap were the Reverend Manasseh Cutler,[14] of Ipswich, Massachusetts, an expert botanist, later famous in the settlement of Ohio; the Reverend Daniel Little, of Kennebunk, Maine, experienced woodsman, familiar with Indian languages and customs; and Dr. Joshua Fisher, of Beverly, Massachusetts, distinguished physician, president of the Massachusetts Medical Society, and founder of a professorship in Harvard College. These four were members of the American Academy of Arts and Sciences, and Dr. Belknap afterwards founded the Massachusetts Historical Society. Two college students and three other men completed the party.

Leaving Dover, New Hampshire, on horseback on 20 July, they carried, in addition to food, blankets, cooking utensils, and tents, a collection of barometers, thermometers, a sextant, a telescope, two surveying compasses, and a chain.

Joined at North Conway by Colonel Joseph Whipple and his Negro servant and Captain Evans, who was to be their guide, they rode on to Jackson and up the Shelburne (Pinkham Notch) road to the base of Mount Washington. Here they made camp in a meadow at the junction of the Ellis and Peabody rivers, not over half a mile from the present site of the Pinkham Notch Camp of the Appalachian Mountain Club.

Next morning the party started for the summit of Mount Washington, leaving Dr. Belknap and Dr. Fisher in camp, because of sudden illness. Mr. Little[15] reported that they reached the "top of the Sugar Loaf" (the summit) in six hours and fifty-one minutes, having rested on the way one hour and thirty minutes. He gives what is probably the first description ever written of the headwall of Tuckerman Ravine:

> This ascent is like steep stairs, the rocks of different forms, wedged in by one another in various attitudes of bigness. . . . This grand ascent took up 56 minutes, with our utmost exertions.
>
> The height of the mountain . . . was computed, in round numbers, at five thousand and five hundred feet above the meadow, in the valley below, and nearly ten thousand feet above the level of the sea.[16]

Dr. Belknap felt that this figure was too moderate, and "that whenever the mountain can be measured with the requisite precision, it will be found to *exceed* ten thousand feet, of perpendicular altitude, above the level of the ocean."[17]

The most important result of this trip was the naming of Mount Washington. In his *History of New Hampshire*, Dr. Belknap mentions the summits of the Presidential Range as seen from Jefferson, and says: "One of these is the mountain which makes so majestic an appearance all along the shore of the eastern counties of Massachusetts [now Maine].[18] It has lately been distinguished by the name of *Mount Washington.*"[19]

From time to time the road through the Notch was improved, that eventually it might be passable for horse-drawn wagons. But it was a very expensive road to build and to maintain, and money for this purpose was not easy to raise. In 1786 the legislature was petitioned to appoint a committee to sell land about the mountains, and to use the money thus raised to fix the road through the Notch, which was badly

out of repair from the effects of a freshet. The committee had been in operation for ten years when it settled accounts and was discharged. One chronicler asserts: "The committee and its friends got most of the lands and the public a very poor road." In twenty miles it crossed the Saco River thirty-two times.

It was during this period that the wilderness through which the Notch road ran began to have a fascination for a pioneer named Eleazer Rosebrook. Born in Grafton, Massachusetts, in 1747, he married in 1772 Hannah Hanes, who was born in Brimfield, Massachusetts, in 1744. A year and a half after the birth of their oldest daughter, Eleazer took his little family into the Upper Coos as far as Lunenburg, Vermont. Here they stopped while he sought a place to settle, and remained until after the birth of a second daughter on 30 October 1773. Thereupon they moved on into the woods, up the Connecticut River to Monadnuc or Monadnock (now Colebrook), thirty miles from the nearest neighbor, and without a road.

How these pioneers managed to live through the hardships and lonesomeness of this woods life is difficult to understand. But with the start of the Revolutionary War, Eleazer volunteered for army service, and moved his family to the safety of a fort in Northumberland, and later to a farm in Guildhall, Vermont, where they lived comfortably until the call of the wild again interrupted the even flow of their lives.

In 1790 the Rosebrooks' second daughter, Hannah, married a cousin, Abel Crawford. Early in the following year Abel left his expectant wife and his baby son with her parents, and set out through the wilderness to find a suitable home for his growing family.

At twenty-five Abel Crawford was tall, broad of back, with the sloping shoulders, bulging biceps, deep chest of the woodsman, and the long tapering legs and slim waist of an athlete. Crawford was tough with the toughness of the pioneer. His eyes were clear, calm, and thoughtful, with a comical little glint that gave proof of the kindly humor that was forever bubbling within. His features seemed rough-hewn on his massive head, whose high brow suggested a statesman rather than a lumberjack. Already he was a man of sound spiritual and moral integrity, a man whose great hands could lift a log or "wrastle" a bear, or could be as gentle as a woman's, and whose broad, full-lipped mouth could set in a straight line that knew no interference, or could relax in a heart-tingling roar of merriment.

Abel was typical of those long-headed and light-hearted Scotch-Irish settlers of Londonderry, New Hampshire, with their deep religious feeling, combined with an amazing love of fun, which mingled

strangely with the most serious concerns. Of them Jeremiah Smith, Chief Justice of New Hampshire, used to say: "They went to church on Sunday, practiced all that was good in the sermon during the week, and laughed at all that was ridiculous."

What made Abel Crawford leave the security of the broad fertile valley of the Connecticut River opposite Lancaster, New Hampshire, is hard to guess. Perhaps it was the same urge that prompted James Crawford, his Scotch-Irish grandfather, to leave North Ireland to sail for Boston with his wife, Elizabeth Campbell, in 1726. In Abel there was a restless spirit that could set no root in the rich, deep loam of the river valley. For its life, his spirit sought the strong earth that clung to boulder-strewn mountainsides and fed to maturity the towering pines and spruce that drank from rushing, crystal-cold streams.

Abel Crawford was no idle wanderer, no fortune hunter. He was an unconscious missionary—a missionary of civilization. In the shadow of mighty Agiochook, among its forbidding ravines and notches and over its jagged crest, Abel found space for his spirit to stretch out its arms to the Infinite, to find peace and strength and solace from the pain and toil that a pioneer family must take upon itself in so rugged a home. Armed only with a flintlock musket, a knife, and a twin-bitted axe, dressed in rough homespun and heavy boots, and carrying his few necessities in a knapsack and his small savings in a leather pouch, he followed first the roads and then the trails of the earlier pioneers to the site now known as Fabyan.

Perhaps somebody had told him about the squatters who had wandered into Nash and Sawyer's Location, put up some little log huts, and struggled along for a bare living. Abel must have been the first prospect of a sale they had ever seen or hoped to see. For, without much thought as to the condition of the huts, but with a firm conviction that the great range of mountains rising across the broad acres of timberland[20] beckoned him to take root and be their friend, young Crawford bought out the squatters who could scarcely wait to leave a life that to them seemed hopeless.

For several months, until the birth of his second child in January 1792, Abel lived alone in one of the huts. Then he brought his wife Hannah and their two sons, Erastus and Ethan Allen Crawford, to live with him in the rough, new home.

But the young couple had scarcely made the log cabin livable when Father Rosebrook came a'visiting. At once he found this lonely location exactly what he wanted for his declining years and promptly bought out Abel, and brought his family to the new home. Abel, again

seeking elbowroom, took his little family down the Notch—wild, rough, and untamed as it was—until at Hart's Location (near what is now Notchland), twelve miles below where the Rosebrooks had settled and eight above the village of Bartlett, he found the spot that was to be his lifelong home.

Well chosen it was, like most of Abel's decisions. At this point the Notch widened to permit a clearing for farmland. The Saco River supplied power for a sawmill and gristmill. The road easterly to Bartlett was fairly smooth and not too steep. There were schools in that village which the Crawford children—finally numbering eight sons and one daughter—attended whenever they could find a home where they could work out room and board, for the snows of winter were so deep as to make the trail impassable for days at a time. It was natural for Abel to turn innkeeper. His house was built on what was to be the principal route from the seaboard to the heart of the White Mountains, and farmers from the Upper Coos and travelers were soon stopping for food and for a night's lodging.

At this same time, Abel's parents-in-law, the Rosebrooks, were living with their younger children in his former log cabin, four miles west of the gateway to the Notch and twelve miles in either direction from neighbors. Where there is today a broad plain stretching west of the Fabyan railroad station, there then rose the fifty-foot height of the Giant's Grave, a huge glacial mound running 300 feet westerly along the road. An Indian legend says that once an Indian madman stood on the Giant's Grave and, waving a pitchpine torch kindled at a tree stricken by lightning an instant before, cried out: "No paleface shall take deep root here. This the Great Spirit whispered in my ear."

Dependent upon their nearest neighbors for food, the Rosebrooks were obliged to go or to send their children twelve miles to obtain it. They were always anxious for the safety of their children on these trips. The way was so rough they feared the horse would break a leg and injure a child. Many an hour Hannah spent in prayer for their safe return, and in thankfulness when they did reach home, often late at night.

As one of the first White Mountain innkeepers, Eleazer Rosebrook performed a valuable service to men and animals about to enter upon the treacherous trail through the Notch, or exhausted from the steep climb up from Bartlett. His first guests, like Abel's, were farmers carrying their produce to market in Portland or Portsmouth and bringing home food and supplies.

Rosebrook's most famous guest was the Reverend Timothy Dwight,

president of Yale College from 1795 till his death in 1817, who was entertained on 2 October 1797. Dwight, on a horseback journey through New England, passed through the White Mountains on the way to Portland, Maine. Arriving at Rosebrook's "log hut," Dwight's party found "comfortable beds, good food, and excellent fare for our horses; all furnished with as much good will, as if we had been near friends of the family."

Night after night the rude, cramped dwelling was crowded almost to overflowing with teamsters, farmers, and an occasional tourist who might never have reached the next inn but for this welcome stopping place.

Thus the Rosebrooks lived for several years, working on their farms and building roads, sometimes for pay and sometimes without pay until in 1803 the Legislature chartered the Tenth New Hampshire Turnpike, to be built through Crawford Notch (then known variously as the "Notch of the White Mountains," or simply "The Notch").

As this meant more business, Eleazer now built a comfortable two-story house,[21] locating it on the western slope of the Giant's Grave, two rooms being underground, the second-story bedroom having a door opening onto the top of the mound, where a fine view of the mountains could be enjoyed. All the comforts of a country inn of that time were provided, even to a well-equipped barroom. Utilizing the Ammonoosuc River, Rosebrook built a sawmill and a gristmill.

While Rosebrook and Abel Crawford were improving their inns and enlarging their farms, the latter's son, Ethan Allen Crawford, was growing up into a big and tremendously powerful young man. Born three years after the death of the Revolutionary hero, his namesake, Ethan was a quiet boy and man, slow to anger, with a will that overcame any obstacle, and muscles like steel springs that would bend under a load, but would spring back to put that load where it belonged—even if it was a three-hundred-pound bear. Of his hardships as a boy he tells how he and his brother Erastus helped their father clear the land. Many a time he would chop till his hands swelled and then pained him in the night so much that his mother would get up and poultice them that he might sleep. "I never had a hat, a mitten, or a pair of shoes, of my own," says he, "that were made for me, until I was nearly thirteen years old." He used to say, without any thought of bragging: "I could harness and unharness horses in the cold winter weather, with my head, hands and feet nearly bare, and not mind or complain of the cold, as I was used to it; it made me tough and healthy."[22] And the cold was often thirty to forty degrees below zero!

During these years Eleazer Rosebrook prospered and lived well. But as his children grew up, one by one they married and left home, until he and his wife were left with one son, William, feeble-minded and needing constant care.

As each child left him and received a dowry with which to start the new life, Eleazer's funds were greatly depleted. Then, to add tragedy to difficulty, in 1816 he was stricken with a cancer of the lower lip. His health failing, Eleazer wrote to his grandson Ethan Allen Crawford, who was then working in St. Lawrence County, New York, offering to give him the farm if he would come and carry it on and care for the grandparents and Uncle William as long as they lived, and if he would pay Eleazer's honest debts. Reluctantly, Ethan finally agreed.

Eleazer died 25 September 1817 in his seventieth year. His name is almost forgotten, but the name Rosebrook still remains in the Mount Rosebrook Range between Bretton Woods and the Zealand River.

Mrs. Rosebrook outlived her husband by twelve years. She died 4 May 1829 in her eighty-fifth year, thus ending the first generation of pioneer settlers in Nash and Sawyer's Location. She was buried beside her husband, near their old home.

In November 1817 Ethan Allen Crawford married his cousin, Lucy Howe of Lancaster, New Hampshire. Their romance barely escaped a tragic ending on the eighteenth of July following their marriage. About eight o'clock in the morning, with no doctor present and no one to help except Lucy's sister-in-law, Mrs. Phineas Rosebrook, Lucy became the mother of a five-pound boy. Toward noon, Ethan left to carry dinner to his men who were working on the Cherry Mountain road. He paused to catch a few trout for supper, and then hurried home. On emerging from the woods he saw flames shooting high above the chimneytops of his house. Fortunately, Lucy and the baby, with a very few of their belongings, had been taken to safety.

A friendly tin peddler, who chanced upon the scene and found Ethan with no means of moving his family, unloaded his cart and made room for feather beds on which the mother and baby, with Lucy's young brother, were moved to the Phineas Rosebrook home, five miles away, attended by grandma and aunt on horseback and Ethan and the peddler on foot. Even the swallows from Ethan's barn followed the family and were soon flying about in Rosebrook's barn.

All but ruined—having suffered a loss of $3000, uninsured, and with nothing left but one cheese and the milk of the cows—the young couple faced the situation bravely. Ethan owned a small house a mile and a half away and decided to move this to the old site. Neighbor

brought their ox teams for the purpose, as well as lunches for all who helped, and it was soon made habitable. Only twenty-four feet square, it served as home for the family and shelter for travelers both winter and summer, until an addition was built in 1825.

Both Ethan and his father had found time from their round of daily chores to become familiar with Mount Washington and the Presidential Range. But it was not until 1818 that the first party came to Abel Crawford's for the express purpose of climbing Mount Washington. They are described in the Crawford *History* as "Colonel Binney, from Boston, with two young men,"[23] driving from Littleton. The young fellows were anxious to climb Mount Washington, and engaged Abel as guide, with a man to act as porter. Climbing back to the head of the Notch, they started up through the woods.

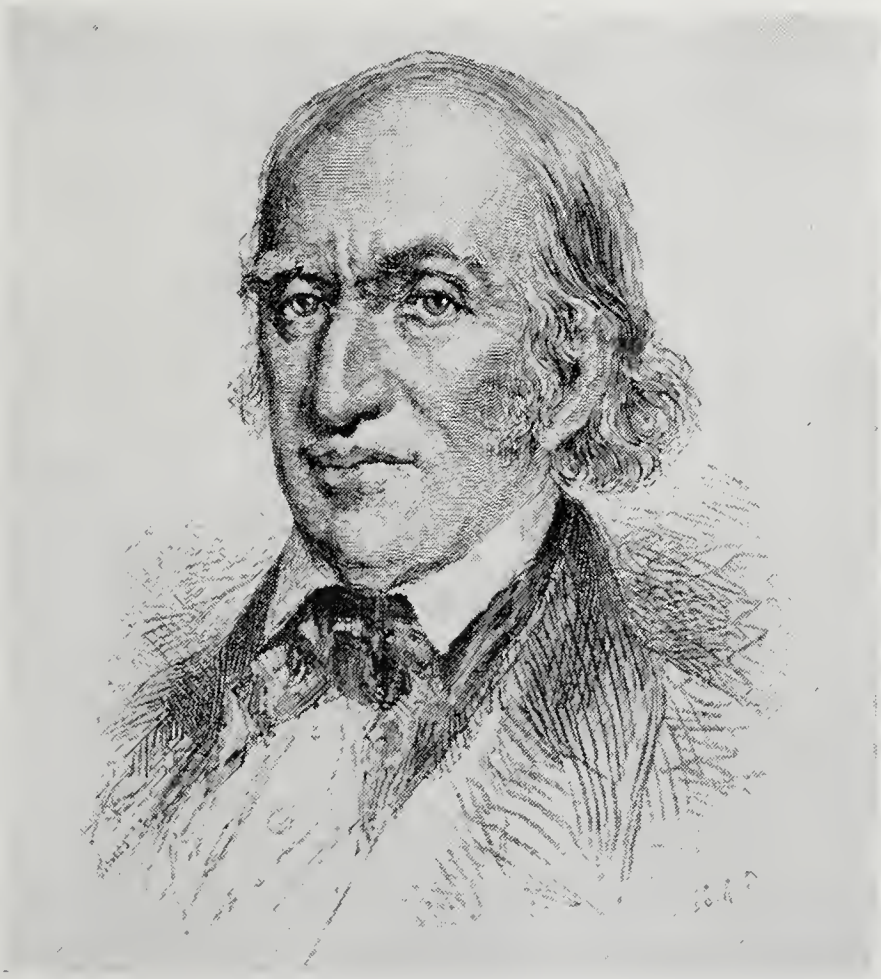
Since no trail had been cut for the convenience of climbers, the party followed Abel through swift mountain streams, over fallen logs and around boulders, ascending through the woods from the present site of the Crawford House. Just below timber line it was necessary for them to force their way through the gnarled and twisted scrub growth, to the "great damage of their costly clothes" and skin, to a point where the trees became short enough and dense enough to walk upon. After a long struggle with the scrub, with darkness coming on, they turned back into the woods and pulled together a shelter of boughs in which, without fire or food, they passed a stormy night. In the morning they managed to find the headwaters of the Ammonoosuc River and followed the stream out safely.

In September Abel was guide for two young men who climbed Mount Washington and set in the topmost rock a brass plate bearing a Latin inscription describing their ascent—prepared, of course, in advance. In 1825 a party of vandals from Jackson, celebrating the Glorious Fourth, stole the plate, but its contents had been copied and translated by other visitors and preserved by Lucy Crawford (with apologies for errors), as follows:

Altius ibunt, qui ad summa nituntur.
Nil reputans, si quid superesset agendum.
Sic itur ad astra.
Itinere facto per inhospitales sylvas
Rustribus pramptis feliciter superstes
(Eheu quantus adest eis sudor!)
Johannes Brazer, Cantabrigiensis,



Ethan Allen Crawford II and son Fred.



Abel Crawford.



Mount Crawford House and Mount Crawford, named for Abel Crawford.



The Notch House, near present Crawford House; both from Oakes' *Scenery*. 1829.

Georgius Dawson, Philadelphiensis,
hic posuerant iv id Septembris MDCCCXVIII.

(They will go higher who strive to enter heaven.
Think nothing done while anything remains to be done.
We go thus to the stars.
After passing inhospitable woods,
And surmounting abrupt ledges
(How it made us perspire),
John Brazer,[24] of Cambridge,
and George Dawson, of Philadelphia,
placed this inscription here on September 10, 1818.)[25]

The Brazer party also filled a bottle, and put it in a rock, but what was in it nobody knows for sure. The party from Jackson found the bottle and used the "spirit" which was in it—which Ethan Crawford says: "I justified them in doing, but did not justify them in carrying away the bottle, which belonged to mother."

At this time Ethan was establishing himself as innkeeper and mountain guide. In May 1819 four men traveling on horseback came to Ethan's to climb Mount Washington. Following his directions, they made the ascent and came back well satisfied, though they had had a hard struggle with the underbrush.

As this was the third party which had visited Mount Washington since Ethan came to live there, he and his father thought it best to cut a path through the woods. Accordingly, says he, "My father and I made a foot path from the Notch out through the woods, and it was advertised in the newspapers, and we soon began to have a few visitors."

This path started near the site of the present Crawford House and went up Mount Clinton nearly to its summit. From there it followed the southern peaks (Pleasant, Franklin, and Monroe) to the Lakes of the Clouds, and then ascended the cone of Washington.

About three miles in from the Notch road, on the trail to "Trinity Height," as the cone of Mount Washington was then called, Ethan built a log cabin, where his parties spent the night before climbing the mountain, and sometimes also on the return trip. Here he would feast his guests on flapjacks and maple syrup, or freshly-caught trout, and entertain them with a never-failing store of anecdotes.

Neither of the Crawfords ever gave a thought to his own comfort or profit when it came to helping others. On a May day in 1819, a man

and his wife put up at Ethan Crawford's for the night. In the morning there were twelve inches of snow on the ground. As the couple were in a hurry, Ethan hitched up a sled, took the wheels off their wagon, and placed it on the sled. Then, with the three of them comfortably seated in the wagon and the extra horse tied behind, Ethan drove twelve miles to Bethlehem. Here the snow ended, and Ethan put the wagon together, and drove home alone. The man gave him a dollar.

On the return trip he went a mile and a half down the Ammonoosuc, or "Ompompanusuck," as the Indians called the river, and took home the frame of an old unused gristmill. From this he made a temporary cheese house. In it he "made twelve hundred weight of cheese," which he sold in the fall at a good price, and "made another payment of $200"[26] on his mortgage.

In September 1819 came one of the first parties to make use of the new path. In the party were Samuel J. May, the abolitionist, Caleb Cushing, the jurist, and George B. Emerson, educator and the author of a classical work on the *Trees and Shrubs of Massachusetts.* All were graduates of Harvard College in the famous class of 1817.[27] They came from Kennebunk, Maine, on horseback, and engaged Abel Crawford to act as their guide up the mountain.

During the summer of 1820, a group of Lancaster men decided to name the highest peaks of the White Mountains for the Presidents of the United States. With Mount Washington already named by Dr. Jeremy Belknap and his expedition of 1784,[28] the plan was to memorialize the Presidents in chronological order, naming the second highest peak "Adams," the third "Jefferson," and the next two "Madison" and "Monroe." The sixth was to be named for Benjamin Franklin,[29] while the seventh retained its old name, "Mount Pleasant."[30] The remaining peaks of the Presidential Range—Mounts Clay and Webster,[31] Clinton,[32] and Jackson[33]—were named at later dates.

Most distinguished of this party was Major John W. Weeks,[34] who came to Lancaster with his father, Captain John Weeks, in 1786. A leader, both as a soldier and in politics, the Major served his community in many offices, from selectman to representative in Congress. Leaders of the party, beside the Major, were Amos LeGro, a surveyor and farmer, and Adino Nye Bracket.

One of the party was Philip Carrigain, who had served from 1805 to 1810 as Secretary of State of New Hampshire, and who was noted for his excellent map of the state, published in 1816, on which is a marginal note describing the White Mountains, ending with the words:

"They are the Switzerland of America." His name is perpetuated in Mt. Carrigain and Carrigain Lawn, "the grassy expanse of some forty acres lying immediately under the southeastern side of the summit, and which includes what has since been called Bigelow Lawn."[35]

Another member of the party was Charles J. Stuart (sometimes referred to as "Stewart"), a lawyer and surveyor, of whom we shall hear more later.

Ethan Crawford tells the story of the christening in his own characteristic style: "This summer there came a considerable large party of distinguished characters, such as the author of the New Hampshire map, etc., to my house, about noon, to ascend the mountains and give names to such hills as were unnamed, and after a dinner of trout, they set out, taking me for a guide and baggage carrier."[36]

They rode to the Notch, and there Ethan was loaded "equal to a pack-horse, with cloaks and necessary articles for two nights, with a plenty of what some call 'Black Betts,' or 'O-be-joyful,' as it was the fashion in those days, to make use of this kind of stuff, and especially upon such occasions." They tramped into the woods three miles to Ethan's camp, where, "after some interesting stories told by the party," they fell asleep.

After breakfast next morning, taking provisions and a sufficient amount of "O-be-joyful," they climbed the mountain trail, coming finally "to a beautiful pond of clear water, distant one mile from the apex of the hill." This is one of the earliest references to the Lakes of the Clouds. After drinking of the water, which they found delicious, they climbed to the summit of Mount Washington. They then gave names to the several peaks, drank healths to them, and proposed a toast to each. Then they called on Crawford to do likewise. But being not much of a man of words, he said simply that he "hoped all of us might have good success and return to our respective families in safety, and find them in health; which was answered by a cheer from all. . . ."

After spending some hours in the clear sunlight on the summit, they descended to the pond, where they stopped so long to drink of the cold water that some of the party became quite blue, and because of this they agreed to call the water Blue Pond.

Apparently the name "Blue Pond" was used for several years. Sweetser says that the Reverend S. J. May "found the name of Washington's Punch Bowl attached to this lake."[37] Certainly it was some time after 1820 before the name "Lakes of the Clouds" came into use.

On 31 August, following the christening, Messrs. Bracket, Weeks,

Stuart, E. A. Crawford, and Richard Eastman made another ascent for the purpose of ascertaining the heights of these mountains. But first they spent a week leveling to the tops of all the mountains from Lancaster. Then they camped for four nights, spending the night of 13 August on Washington. Their survey indicated the height of Washington as 6428 feet.[38]

One author has suggested that this visit marked the first time a "human being ever passed a night there." But Dr. Frederick Tuckerman (1857–1929), who has written widely on the White Mountains, found a much earlier visit, related by Dr. George C. Shattuck of Boston in 1807. Shattuck said that his guide informed him that the summer before "he had accompanied General D. [Dearborn?] and Colonel W. [Whipple?] to the summit," where a terrific thunderstorm made it dangerous to descend. Therefore they camped on the rocky summit, without fuel and soaked by the incessant rain.[39]

Although the earliest ascents of Mount Washington were made from the eastern side, there was no road into Pinkham Notch and no habitation there until many years after the settling to the west of the Presidential Range by the Rosebrooks and Crawfords. It was in early fall of 1820 that a path was bushed out from the Upper Settlement, or Adams (now Jackson), into the Glen and thence through the forest and the growth of scrub trees to the bare cone of Mount Washington.

In the summer of 1824 the "Pinkham Road," later called the "Glen Road," and now State Highway No. 16, was cut out to the Peabody River, and a log cabin was built at a point on the road convenient for departure for the summit of the mountain.

About this time Ethan Allen Crawford found that the path he and his father had cut out in 1819 was much out of the way for his own patrons. What he needed was a more direct route from his inn on the Giant's Grave to the base of the mountain. Therefore, in March 1821, he hired Surveyor Stuart "to come with his compass and go into the woods,"[40] to find a better approach for climbers. They set out with provisions, blankets, fireworks, and snowshoes for the woods. Setting their compass, and spotting, or blazing, trees with their axes, in three days they had marked out a fairly direct and comparatively level way of nearly seven miles, following the course of the Ammonoosuc River. This did away with going over a succession of little hills, which had made the hike to the base most tiresome. Also this new route appeared feasible for a road to the base, from which climbers could ascend a ridge or spur of the mountain, which was afterwards used for the cog railway.

It is evident that Ethan had used this route before, and that he was familiar with the steep and difficult crag overhanging the Ammonoosuc Ravine that was called "Jacob's Ladder," from which the highest trestle of the cog railway, just below this crag, received its name. A huge boulder on the "Ladder" was given the name "Ethan Allen's rock" by one of his guests, who found it a convenient resting place. And, in 1878, there was discovered, chiseled into its side, the inscription: "E. A. C. 1820."

Some gentlemen from Boston liked the idea of a road so well that they got up a subscription of nearly $200 for the purpose of building a carriage road, which was to be ready within three years. But since Ethan's financial difficulties were so pressing that he did not feel he could carry out the obligation, he declined the assistance, preferring to build the road a little at a time as he was able.

During the summer of 1821, just before haying, Ethan hired men and went with them into the woods to cut out the new path. When he was about three miles from home, as he was standing on an old log, chopping with his axe raised, the log broke under his weight, and he came down with such force that the axe struck his right ankle and glanced off, nearly severing his heel cord.

This wound laid Crawford up much of the summer, but the other men finished cutting the path through the woods, and, as Ethan thought it over later, he wrote: "So it is that men suffer various ways in advancing civilization, and through God, mankind are indebted to the labors of men in many different spheres of life."

Up to this time Ethan had used for his mountain parties the old camp he had built three miles in from the Notch on the original path cut out in 1819. With the new and shorter path cut through from his inn to the base of the mountain, a more convenient camp was needed. So the old one fell into disuse, and a new one was "rolled up" six and three-quarter miles northeast of the Inn and only two and one-quarter miles from the summit.[41] At an elevation of 2800 feet, this camp stood close to the present Marshfield, the little settlement at the base of the cog railway.

Because mice and squirrels destroyed everything left in the camp, Ethan had found it necessary to carry a pile of blankets and provisions on his back every time he climbed Mount Washington. Growing tired of such exertion, Ethan bought enough sheet iron to make a chest big enough to hold ten bushels of food and equipment. In the chest he deposited eleven blankets, cooking utensils, and anything else that he wished to keep for another trip.

This camp was actually two open-sided log cabins, standing facing each other, with plenty of room for a fire in the middle. The wood was cut from six to eight feet in length and rolled together any way or size that could be managed. When one pile burned out, the men put another one on, and thus kept a good fire through the night. It was that summer that women began to climb Mount Washington, so, to make them quite comfortable, a blanket curtain was strung up before their camp, while the men occupied the other cabin. Then, as Ethan quaintly comments, "the untiring mosquito would sing to us constantly and every now and then would stop and taste a little."[42]

Only a few rods from Ethan's camp was the Ammonoosuc River, from which trout could be caught at the pleasure of the fisherman. "These," said Ethan, "I could cook to a charm, much better than an old experienced cook in a city hotel could,—at least, they tasted much better here than there. I had plenty of good salt pork to cook them with, and that is the very thing that gives them a relish; and fatigue would never fail of giving us good appetites."

William Oakes, well known as the most distinguished botanist of New England, for whom Oakes Gulf on the southeasterly slope of Mount Washington was named, was a frequent visitor to the White Mountains. From him Ethan Allen Crawford received a gift of "a box of tin-ware of a superior quality . . . containing an apparatus sufficient for a number to eat and drink with together . . ." so there were plenty of conveniences for serving the weary mountain climbers.

On 31 August 1821 three young ladies from Jefferson, New Hampshire, the Misses Austin, formerly of Portsmouth, came "to ascend the hills, as they were ambitious . . . to have the honor of being the first females who placed their feet on this high, and now celebrated place, Mount Washington."[43]

With them came their brother, and Charles J. Stuart, who was engaged to Eliza, one of the sisters. A tenant on their farm in Jefferson came as a porter to carry the baggage. They went as far as the first camp, some three miles, that night, hiking the next morning to the other camp, near the base, where they spent the second night.

Then the weather turned bad, and they decided to spend another night in camp. Their porter went out for supplies. He had grain standing in the fields that needed attention, and begged Ethan to take his place with the party. So the doughty Crawford shouldered his pack, took a cane to help his lame foot, and overtook the group. The weather improving, they started for the summit at 6 a.m., arriving "just as the sun had got to the meridian."[44]

"What a beautiful sight!" wrote Ethan. "We could look over the whole creation with wonder and surprise, as far as the eye could extend . . . and view the wonderful works of God! Every large pond and sheet of water was plain to be seen, within the circuit of one hundred miles. . . ."

The ladies were delighted with their adventure, which occupied five days and three nights. Ethan adds: "I think this act of heroism ought to confer an honor on them, as everything was done with so much prudence and modesty by them; there was not left a trace or even a chance for a reproach or slander excepting by those who thought themselves outdone by these young ladies."

The first known exploration of the Ammonoosuc Ravine was by two young men of a famous Boston family—John Lowell, Jr., and his cousin, John Amory Lowell. They registered at Ethan Allen Crawford's inn on 2 July 1823, when they climbed Mount Washington, descended to the Lakes of the Clouds, and thence down the ravine, which they dubbed "Escape Glen, a passage romantic and precipitous." One of them nearly lost his life, when the root of a tree, by which he was lowering himself, gave way "over a perpendicular precipice of 50 feet."[45]

Until the summer of 1823 there was no shelter of any kind on the summit of Mount Washington. The experiences of parties cloud-bound on the summit showed the need of such a refuge. A few had sweated out storms among the rocks, while others, like the geologist James Pierce, camped below the cone. Pierce has left in his *Excursions among the White Mountains of New Hampshire, and to the Summit of Mount Washington, in June, 1823* an account of the scenery and natural history which is still valuable. Ascending from the Notch, he camped for the night at the foot of the cone, "on a sheltered spot of the steep eastern side of the ridge, about a mile above the sea." His descent was through the Ammonoosuc Ravine to the Rosebrook farm. "The latter," he says, "occupied by E. A. Crawford, a good guide to the White Hills, is the only considerable clearing in the mountain section of the valley for ten miles."[46]

In July of 1823, Ethan Crawford and another man took blankets, provisions, and other necessities for a small party who wished to spend the night on the summit of Mount Washington to be on hand to see both the sunset and sunrise.

They stayed overnight at the camp at the foot and ascended the mountain early next day. Then they collected rocks and built three stone cabins, in which they laid a quantity of dry moss for beds,

spreading over this their blankets, "and at an early hour, on this elevated spot, retired to rest, now prostrate on the ground, so much nearer Heaven than what we had ever been accustomed."[47] This is Ethan's description of the first sunrise reported from the summit:

> When the sun rose, it came up, as it were, behind a veil, and appeared the bigness of a good sized cartwheel . . . then it rose from behind this cloud, and came out in its full splendor and glory. This was the first night I ever slept on Mount Washington. One of the party made the following lines:
>
> "The Muses' most inspiring draught,
> From Helicon's pure fountain quaff'd,
> What is it, to the rising sun,
> Seen from the top of Washington!
> Canst thou bear a dreary night?
> Stranger! go enjoy the sight."
>
> We then returned over Munroe [*sic*], Franklin, and Pleasant Mountains, following our old path, came in at the Notch, and from there home.

In August 1823 Ethan had as guests some young divinity students. He guided them up the mountain, and tried to lighten the trip by telling some anecdotes. But as this did not seem to fit in with the exalted feelings of the young students, he gave up the attempt and "remained silent most of the way; and when arriving at the summit, they on this high and elevated spot offered prayers to Almighty God for his goodness. This was, I think," comments Ethan, "the first prayer I ever heard on this mountain."[48]

Because the little stone huts proved damp and cheerless, they were only once afterwards slept in. So, in the summer of 1824, Ethan went to Portland and bought a large tent, or marquee, for twenty-two dollars, large enough for eighteen persons to sleep at one time, and a sheet-iron stove for six dollars. These he carried to a point near the top by a "spring of water which lives there."[49] The tent with the tackling belonging to it weighed over eighty pounds. This Ethan carried up on his back, along with a large pole cut to stretch the tent around.

However, the storms were too violent for the tent, and it soon wore out. At this time Ethan also took up the first "register" for summer visitors to the mountain. This was a sheet of lead eight or ten feet long, seven inches wide, and the thickness of pasteboard. He put this around a roller. On the lead visitors could record their names with an iron "pencil" Ethan had made. This he said was easier than carving one's initials on the rocks with a hammer and chisel.

Although Lucy Crawford devoted most of her time for many years

to entertaining visitors and outfitting them for the climb, she herself had never been to the summit of Mount Washington. Perhaps this was because of Ethan's strong conviction that mountain climbing was a sport for men alone. But in August 1825 a gentleman and his sister from Boston came to the inn and asked to have Lucy accompany them. They were held two nights in Ethan's camp because of rain, and then were repaid by having a glorious day on the mountain top. Ethan remarks that his wife "went and returned without any assistance, excepting in descending what is called Jacob's Ladder."[50]

However much Ethan said to dissuade the ladies, they still came for the climb. On the twenty-seventh of the same month the third party with ladies arrived at Crawford's to ascend the mountain. This was the family of Dr. John Park of Boston, including his wife and their three children. With them was their driver, and Lucy Crawford's younger brother, William Howe, as guide.

Running into a violent storm on the way up, Mrs. Park and one daughter found shelter in a cleft between large rocks, while the others made it to the top. Of the tempest Dr. Park wrote in the Crawford Album:

I have experienced gales in the Gulf Stream, tempests off Cape Hatteras, tornadoes in the West Indies, and been surrounded by water spouts in the Gulf of Mexico, but I never saw anything more furious or more dreadful than this . . .

Gentlemen, there is nothing in the ascent of Mount Washington that you need dread. Ladies, give up all thoughts of it; but if you are resolved, let the season be mild, consult Mr. Crawford as to the prospects of the weather, and with every precaution, you will still find it, *for you*, a tremendous undertaking.[51]

This was a great year for lady climbers. Despite all the warnings, another party of gentlemen with three ladies came in September, and Ethan went up the mountain with them. They made the ascent comfortably and were back on the fairly level trail below the base when one of the ladies became so lame in her ankles that she could hardly walk. So Ethan took the bundle of clothes from his pack and made a cushion on his right shoulder, to which the other men hoisted the lady. Then, with his hat in his left hand, the Giant of the Mountains walked along for several miles without difficulty. He says: "I have brought gentlemen along in a similar way, when they thought they could go no further."[52]

As was usual with Mr. Crawford's parties when on the summit, they

all joined in singing "Old Hundred" (the Doxology) before starting down. This custom originated in August 1824, when, as Ethan says, ". . . we had another party who ascended the mountain, and while there the clouds passed swiftly from under us and a rumbling noise of thunder was heard, which excited a clergyman, one of the party, who offered up a very appropriate prayer to Almighty God, and then we sung Old Hundred, in the lines set to that tune."[53]

Life for Ethan Allen Crawford was one continuous battle with the elements—the torrential rains, the deep drifting snows, the fearsome, penetrating cold, and the wind—the wind that never seemed to stop.

Nowhere was that menace more a reality than where the winds sweep down off the flank of Mount Webster through the narrow Gateway to Crawford Notch—the "Narrows," as it was earlier called. Even a man of such gigantic strength as Ethan Allen Crawford knew the terrors of the Narrows, and the dangers that beset travelers who had no house nearby at which to stop.

He used to say that "the wind comes down through the Narrows of the Notch with such violence, that it requires two men to hold one man's hair on, as I have heard them say." He had seen loaded sleighs picked up by the wind and carried several rods to a stone wall that was frozen down so firmly it was impenetrable. He heard a "second-hand story from a clergyman, that the wind was once known to blow so hard here, that it took a log chain and carried it to the distance of a mile or more."[54]

Once, when he was going down to the Notch House with a load of hay, which he had hauled sixteen miles from Jefferson, while going round the elbow of the Notch at the Narrows, a gust of wind upset the load toward the gulf. Ethan turned instantly, placed his feet against the stone wall, and held the load from going over a precipice of a hundred feet, horses and all. When the wind abated, he put his shoulder under the load and righted it again, and went on. Such was the daily routine of this Giant of the Mountains!

Standing staunchly at his side through all hardships and difficulties, the source of a moral and spiritual courage that was even greater than his own Herculean strength, was his wife Lucy. A delicate woman she was, yet without her, Ethan was helpless as a baby. As hostess of their primitive inn, Mrs. Crawford won the friendship of everyone. It is not strange that their house was filled to overflowing year after year.

But how she did her share of the work is a never-ending wonder.

Running the house, welcoming the guests, making beds and readying the rooms, cooking, washing, scrubbing, often with little or no help, and bringing into the world ten children, nine of whom lived to grow up, would seem more than a task for the strongest woman. And when it grew too dark for housework she found time, by the light of a tallow candle or whale-oil lamp, to keep a journal of her own and her husband's important doings.

What difficulties Lucy worked under in running their little inn can scarcely be imagined. They had one room, half the size of the house, which they used as a kitchen, a "victualing" room, a sitting room, and, when crowded, a sleeping room. They also had a stove for cooking in a woodshed adjoining the house, where a part of the work could be done. But the overflow went right back into the more roomy kitchen. Only such a woman as Lucy could have suffered through all these inconveniences without a murmur or complaint. She always said "there was an overruling Providence in all these things, and that these and some other difficulties were to try us, and she would always put some good construction on everything, and view things on the bright side, and in this way we got along, and lived peaceably together without any difficulty."[55]

In the winter of 1825 Ethan bought brick for a chimney and drew it twenty-one miles, "which made quite a job of it; the lumber I had to draw from twelve to twenty miles. This, with what other work I had to do, made a good winter's work for me." In the spring he hired a joiner, a mason, and a painter, and had the new addition to the inn ready for the summer company.

Their financial difficulties were always just a jump ahead of this plucky couple. Of the enlarged house Ethan said that, with plenty of house room, they began to feel quite comfortable. But the room required a good deal of furniture to make it any way decent, without extravagance, and they were obliged to buy such things as were really necessary. Instead of getting out of debt, they were plunging in still deeper. Ethan's creditors usually were kind enough to call upon him rarely when he was unprepared to meet them, but, unfortunately, not all proved so generous.

In the winter of 1826 Ethan had to build again. His shed and stable room was too small. So he started hauling boards from his father's new sawmill up the steep twelve miles out of the Notch. It was another of those tasks that no ordinary man could have accomplished. In the spring he hired men, and soon had a line of stables and sheds

nearly 150 feet long facing the road. The outside of these buildings was almost finished when a stop was put to all outside work by the great rain that precipitated the Willey Slide.

Perhaps nothing illustrates the swift changes that can occur in Mount Washington weather, and the awful havoc these changes can bring, more forcefully than the story of the Willey Slide of 28 August 1826.

Present-day travelers, pausing for a meal or a night's lodging at the cabins where once stood the Willey House, may well wonder why anybody would have wished to settle in that lonesome spot over a century ago. The road was long and rough and led steeply up to the Narrows, where even a man of Ethan Allen Crawford's gigantic strength found the going hard. That twelve-mile stretch from Abel Crawford's Mount Crawford House to Ethan's red tavern with the moose horn over the door had proved almost too long for many a weary traveler. A break was needed where the old Notch House—later to be called the Willey House—"was built in the year 1793, by a Mr. Davis. . . ."[56] An inn was kept by him for a short time, later by Mr. Henry Hill (1797) and others for a few years and then abandoned. Even the opening of the Tenth Turnpike in New Hampshire, incorporated 27 December 1803, "to extend," says an old *Gazetteer*,[57] "from the west line of Bartlett through the Notch of the White Hills, a distance of twenty miles" failed to make the inn profitable.

As so often happened, when a real need arose Ethan Allen Crawford was the one to try to fill it. In the fall of 1823 he hired the Notch House, and put it in shape to serve "travelers and their horses." But the competition of his own inn west of the Notch, and of his father's well-established hotel only a few miles down the Notch made the venture unprofitable. In less than two years the house was again untenanted, and remained so until Samuel Willey, Jr., with his wife, Polly (Lovejoy), and their five children moved into the dilapidated building in October 1825, taking with them as hired men two young natives of North Conway, David Allen and David Nickerson.

What led this courageous couple to leave the security of their valley farm in North Conway to settle in this forbidding spot is hard to understand. The nearest neighbors were four miles to the east, eight to the west. In front of the house was a small clearing, across which flowed the Saco, a half-dry rivulet in summer, a raging torrent when spring rains melted the deep snows. Up and down the Notch and across the river were deep, impenetrable woods, with the sheer wall of

Mount Webster rising a thousand or more feet directly from the foot of the Notch. Back of the house the forest-clad flank of Mount Willey —later named for the unfortunate family—rose abruptly, shutting off entirely the afternoon sun, and bringing night early to the dwellers in the Notch.

In June 1826, scarcely a year after the Willeys had moved to their new home, came a forewarning of the great disaster. Abel Crawford and his men were at work on the turnpike through the Notch when it commenced to rain so heavily they were obliged to seek shelter in the Willey House. Looking out a window, Mr. and Mrs. Willey saw high above their house a movement of rocks and earth coming down the mountainside, taking all before it. In this mass were whole trees, standing upright for a distance of ten rods or more before they tipped over. The avalanche continued slowly across the road and then for some distance on the level field before stopping.

This so frightened Mrs. Willey that she urged her husband to harness his horses and move the family to Abel Crawford's. But Willey felt that the road might be blocked by more landslides, and that the bridges across the river might be washed away, and so they remained. When the storm had stopped, and the roads were again made passable, Mr. Willey decided that it was all right for them to continue living in the Notch. Finding what he felt was a safe place for a refuge in case of another such storm, he placed a good tight cart body in such manner as would protect them from the weather should they need to escape from the house. But their sense of security was short-lived. Only two months later all the North Country was in the path of one of the most destructive storms ever to visit that area.

Early in the morning of Monday, 28 August, with the whole area inches deep in dust, a torrential rain broke the two months' drought, and continued until midnight. Tuesday morning Ethan and Lucy Crawford were aroused by their little boy Harvey, who cried out: "Father, the earth is nearly covered with water, and the hogs are swimming for life."[58]

Ethan's crops were destroyed, many of his sheep were killed, and a shed ninety feet long was wrecked. A visitor reported: "On going out we noticed the singular appearance of the mountains, from which the slides had fallen, and were assured by Mr. Crawford, as well as by a landscape painter [Henry C. Pratt of Boston], who had taken views of the mountains but a day or two previous, that the changes all occurred during the night."

On Tuesday, the Reverend Carlos Wilcox[59] of Hartford, Connecticut, with two friends, arrived at Ethan Crawford's. They had left Hanover, New Hampshire, on Saturday, driving a light surrey over a road that was "like a bed of ashes two or three inches deep" as a result of the long drought. On Monday the rain forced them to stop overnight in Bethlehem. Tuesday they reached Crawford's after a struggle of many hours to get their horses and wagon by or over the fallen trees and through the deep sand deposited by the overflowing river.

To the east of the mountains, Samuel Willey's brother, the Reverend Benjamin, Congregational minister in North Conway, and best known as author of *Incidents in White Mountain History*, was preaching on Sunday the twenty-seventh in a town to the south. While driving home on Monday he noticed that "the clouds were not so rapid in motion as I had seen before, but their volume and blackness . . . more than made up for the want of speed. . . . They reminded one of some heavy armed legions moving slowly and steadily to battle . . . covering [the mountains] . . . fold after fold with their dark solemn drapery." He said he had never before seen a storm gather with such grandeur and awfulness; and that when the rain began, he had never before known such a rain.

At midnight Benjamin Willey was aroused by the slamming of a barn door, and went outside to find that all was "clear overhead; not a cloud on the sky, and the moon shone brightly," so rapidly had the storm come and gone. Next morning he noted the terrible devastation the storm had produced, such as he had never seen in all his life. He reported later that "more destruction of trees, and more displacing of rocks and earth, were made on the declivities of the mountain . . . on that terrible night, than had been made since the country was settled."[60]

The first person to go through the Notch on Tuesday was a Mr. Barker, traveling on foot from Whitefield on his way either to Bridgton, Maine, or to his home in Effingham, New Hampshire. Stopping at Ethan's about noon, he asked help to go through the Notch. By four in the afternoon, the water in the river had fallen enough for Ethan to swim a strong horse across, taking Barker behind him, and landing him safely on the opposite side. Crawford then swam his horse back to the home side. Barker made his way down the wrecked road, and reached the Willey House about dark. He found the house uninjured, but the barn destroyed by the slide; two horses dead and two oxen pinned under timbers, and no other living creature but the dog.

Indoors he found the house in confusion, garments and bedclothes scattered. On the table lay the Bible, open as if it had been read before the family left, at the Eighteenth Psalm:

> The Lord also thundered in the heavens, and the Highest gave his voice; hail *stones* and coals of fire . . . Then the channels of waters were seen, and the foundations of the world were discovered at thy rebuke, O Lord, at the blast of the breath of thy nostrils. He sent from above, he took me, he drew me out of many waters . . . He brought me forth also into a large place; he delivered me, because he delighted in me.

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Barker passed a wretched night, disturbed by the moans of one of the cattle which he had been unable to release. Wednesday morning, having set the creature at liberty, he started down the Notch, and brought news of the tragedy to Bartlett and North Conway.

Wednesday the thirtieth dawned clear and beautiful. The river had fallen enough to be forded by a horse and wagon. While Ethan and the Reverend Mr. Wilcox started for the Notch, Thomas Crawford, with a party of six, set out for Mount Washington. Ethan and Wilcox drove two miles towards the Notch. Then came five miles on foot over the wrecked highway. Wilcox wrote: "In some places the road was excavated to the depth of fifteen and twenty feet; in others it was covered with earth and rocks and trees to as great a height."[61]

Near the Willey House they found the cows with their bags filled with milk, not having been milked since Sunday. Ethan wrote: "My heart sickened as I thought what had happened to the inmates of the house. We went in and there found no living person . . ."[62]

That all the Willeys had perished now seemed almost certain. The arrival of one of Ethan's brothers from the family home a few miles down the Notch with word that the valley for many miles "presented an uninterrupted scene of desolation"[63] convinced Mr. Wilcox that there was no hope of their having escaped. Ethan wished to go to his father's, but Mr. Wilcox felt that he must return, and dared not make the trip alone. So they returned to Crawford's, arriving about four in the afternoon.

"I could not be satisfied about the absent family," says Ethan, and forthwith he made a second trip to the Willey House, finding this time a number of neighbors from the lower end of the Notch, who reported finding no trace of the missing persons. Ethan continues: "My feelings were such that I could not remain there during the night, although a younger brother of mine . . . almost laid violent hands upon

me to compel me to stay, fearing some accident might befall me, as I should have to feel my way through the Notch on my hands and knees."[64] This he did, arriving home at ten o'clock that evening, at the same time the Mount Washington party returned unsuccessful, having found the path and camp entirely destroyed.

Notwithstanding the severity of the storm, the North Conway relatives of the Willeys felt no anxiety for them until Wednesday afternoon. That noon Barker had reached Bartlett, pausing at the tavern of "Judge" Linus Hall, a well-known figure of the time. There they were joined by Edward Melcher, who, with his wife and four children, had escaped with minutes to spare when his farm across the Saco River was flooded Monday night.

Among those who heard Barker's story was Dr. Chadbourne of North Conway, who took the news back home to Benjamin Willey. Friends of the Willeys meanwhile had sent a man up the Notch to learn the fate of the family. Late Wednesday night he returned to the Lovejoy home. Unable to cross the swollen Saco, he blew a trumpet, whose echoes brought out the entire neighborhood to hear the dreadful news. By daylight every able-bodied person was on his way to the Notch.

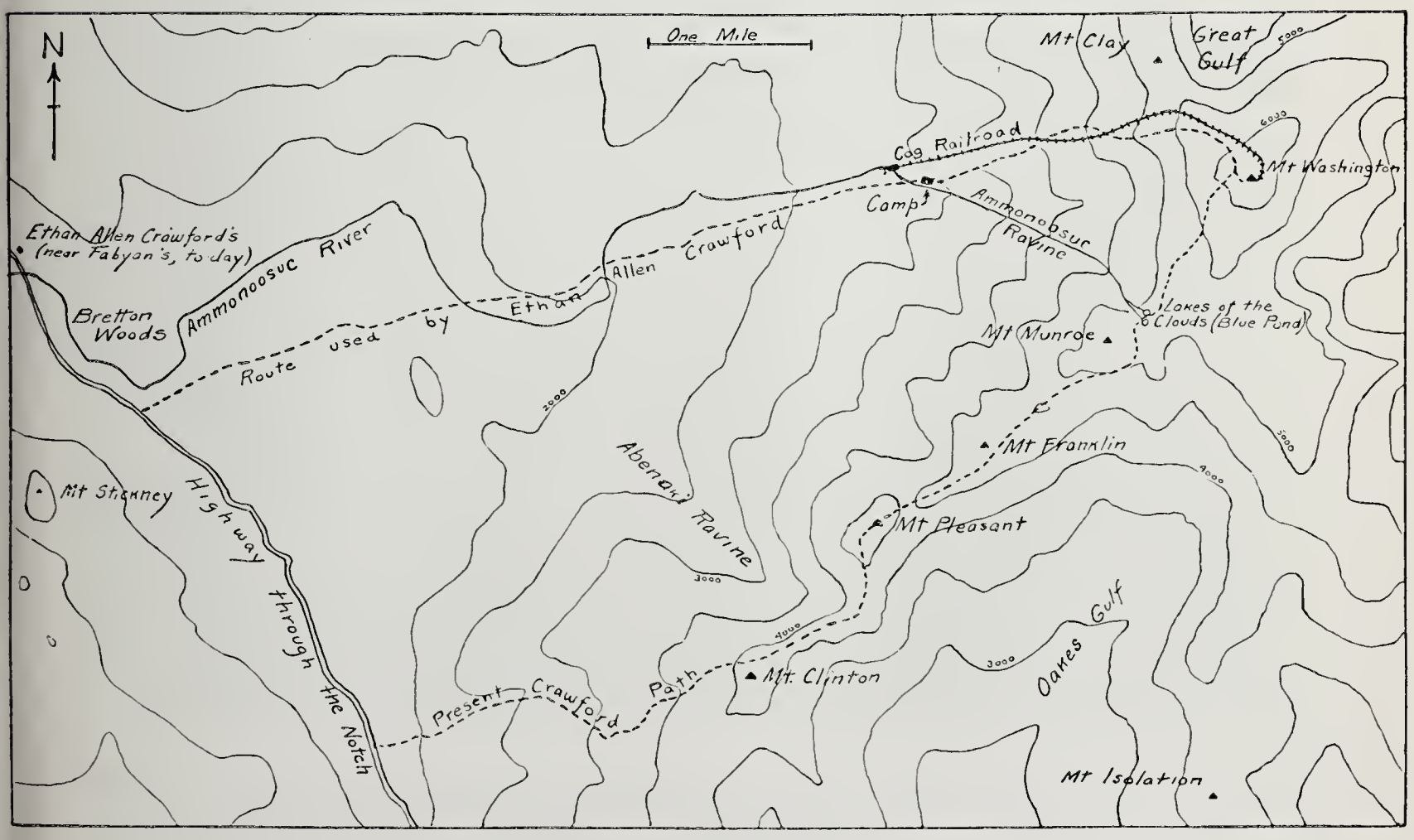
Thursday the remains of Mr. and Mrs. Willey and the hired man David Allen were discovered buried beneath a huge pile of floodwood near the house. They were placed in coffins and next day buried nearby.

Reverend Benjamin Durgin Eastman[65] of North Conway and David Nickerson's younger brother, George, continued the search on Sunday. About noon, while gathering material for a raft, they found a straw mattress floating among the jam of wreckage on the river. Then they uncovered the bottom of a little child's foot, that of Sally, aged five, the youngest. A few minutes later, poling the raft into mid-stream, they came upon another floating object, which proved to be the body of Eliza Ann, twelve years old, the oldest of the five children. Not a bruise or a mark was found upon her. It was supposed that she was drowned. None of the other children were found. George Nickerson kept up his search until Tuesday, when he finally found the remains of his brother. The following winter the bodies of the four Willeys were removed to North Conway and buried in the family burying ground.

Several questions arose as to the tragedy. Why was the straw mattress taken from the house if the family were rushing to escape the slide? How did it happen that Eliza Ann was drowned? The Willey



Detail from "White Hills" woodcut map of New England, first map engraved and printed in America, by John Foster of Boston, from Hubbard's *A Narrative of troubles with the Indians in New England*, Boston, 1677.



Map of Ethan Allen Crawford's bridle path from near Fabyan to the summit of Mount Washington. Note Blue Pond at right.

H. B. Dales as many
as Longfellow Portland } Augt. 26. 1836

H. W. Allen
Miss E L. Allen
Miss C F. Allen } of Brunswick &c
Miss L. V. Ward. of Savannah. Ga.
Miss A. Dwight — of Connecticut.
arrived Thursday ~~Sept~~ 15. 1836.
Mr Allen & Miss C F Allen attended
Mt Washington Sept. 16.

Chas. Sumner
of Boston, Mass.
Sept. 15th '36 — ascended Mount
Washington.

Hiram Perkins
of Henderson
N.Y.
Sept 18-1836
ascended Mount
Washington

From the Crawford Album: the poet Longfellow at top; U. S. Senator Charles Sumner, center.

relatives continued to discuss these and other questions until one night James, the oldest brother, in a dream seemed to see and talk with his brother Samuel. The latter told James that some time before the avalanche they found the Saco was rising so rapidly that they feared they would be swept away and drowned. So, leaving the house, they went back to the foot of the mountain, taking some articles for shelter from the storm. Unfortunately, this cut off their chance of escape when the slide came.[66]

It was the Reverend Benjamin Willey's feeling, as expressed in his book, that this is the best explanation of what actually happened. How the slide was divided and the house saved is explained clearly by the Reverend Mr. Eastman who, as a young man, joined the search and had ample chance to study the ground in the four days he was helping. Some rods back of the house, and extending to the base of the mountain, was a high ridge in which lay a huge boulder, whose surface had never before been discovered. The front of the slide, consisting of old logs, trees, brush, bark, and moss, floated over this embedded rock and lodged against the house, while the rush of water, rocks, and other mountain debris made channels each side of the rock. The force against the house was thus broken, but the north branch of the slide swept away the shed and crushed the stable. Reverend Mr. Eastman said that over forty-five feet of the "very straight and smooth surface of the uncovered boulder was . . . disclosed."[67] The cavity burrowed out at the base of the rock was at least thirty feet perpendicular below the surface of the original ridge.

Samuel Willey had placed a large log near the foot of the mountain to protect the house from rolling stones. When Eastman arrived at the house, this log lay high and dry on the very top of all the other accumulated debris against the house, the log itself not touching the house. The log was about thirty inches in diameter and twenty to twenty-five feet long, and lay as high as the eaves. If it had not been for the imbedded rock dividing the waters and the accumulated debris, this log would most certainly have hit the house like a battering ram.

In the century and a half that has passed since the Willey Slide, many severe and damaging storms and floods have struck the North Country. None seems to have had the same impact upon popular interest and sympathy as the destruction of this one pioneer family in their lonely home. Many articles, stories, and verses of homespun poetry commemorated the event, and even today visitors to Crawford Notch pause to try to trace the course of the historic Slide.



3. Later Years of the Crawfords

THAT tragic storm did irreparable damage to the property of the Crawfords. Most of Ethan's fences were washed away. In some places his farm was covered so deeply with sand and gravel that it was ruined. All over the intervale—the rich farm land lying along the Ammonoosuc—floodwood was piled in immense quantities. Ethan's long shed and the bridge across the river were torn to pieces. A large field of oats from which he hoped to harvest four to six hundred bushels was destroyed, as was some hay in the field. His total loss was in the neighborhood of $1000. Add this to the notes still owing from the time of the fire, and Ethan was over his head in debt. He was in a treadmill from which there seemed no escape.

His father, Abel, suffered still more severely. Most of his farm was entirely ruined. A sawmill that he had just put up was destroyed. His fences were all gone. Twenty-eight sheep were drowned, and considerable standing grain was swept away.

During the storm, the water rose on the outside of Abel's house twenty-two inches, and ran through all the lower floors, destroying everything in the cellar, breaking in part of the cellar wall, and sweeping out the coals and ashes from the fireplace. Abel was several miles away in Bartlett, so Hannah and the children who were at home lighted candles and placed them in the windows. Hannah, like a true pioneer wife, took down a long clothes pole, stood at a window near the corner of the house, and pushed away the timber and other debris that swept down in the fast-running current, thus keeping it from collecting and forming a jam that might have broken and swept away the house.

Abel never recovered fully from this loss of the property that he had

labored so many years to build up. To make things even worse, the turnpike was ruined the entire length of the Notch, a distance of seventeen miles. The directors of the turnpike company looked over the damage, and figured that it was more than they could stand. But the people of Portland took up a collection and raised $1500 to help the mountain people rebuild their lifeline road. This spurred the directors to raise the rest, and the neighbors pitched in to rebuild the road and bridges. This was no easy task in the approaching fall, for, as Ethan said, "The sun shone so short a time in this Notch, that the hardy New Hampshire boys made up their hours by moonlight."[1] With the road rebuilt and the number of visitors increasing, Ethan Crawford's fortunes seemed to be on the mend, although with all his hard work he could never quite get clear of his debts.

In the spring of 1827 Ethan began to build a road suitable for carriages towards the base of Mount Washington, and made it passable for a mile and a half from the highway. This encouraged climbers to visit the mountain in greater numbers than ever, and ascents by women were no longer a rarity. In the following year he extended the road to a point within a mile of the base. Then on 2 September came a furious rain, carrying the river higher than even in the storm of 1826. This damaged the road so much that Ethan gave up the idea of a carriage road and by another year converted it into a bridle path on which visitors could ride seven miles from the house, nearly to the site of the present Marshfield station of the cog railway.

Again the turnpike through the Notch was damaged so badly that the directors refused to spend a cent to restore it. Abel and Ethan Crawford objected to being cut off from the outside world for the winter. Ethan found a man competent to estimate the cost of the job, and they tramped down the length of the Notch making the necessary calculations. After getting his father's advice, Ethan went to Portland, where he got a letter from a director addressed to a large stockholder stating that they would have to leave the road impassable all winter.

Armed with this letter, Ethan had no trouble in getting proxies for the control of the coming annual meeting, early in October, when he put through a vote to repair the road and to levy an assessment on the shares. "There were some against me," he says, "but I had the power in my hands and I could rule them as I pleased." Contracts were let for small sections of the road, and the work was rushed through, so that they had "a tolerable sleigh path for the winter."[2]

As usual, Ethan found himself left holding the bag. For, the money

giving out, he was forced to borrow $300 from the bank to pay off the men, to advance $400 from his own resources, and then wait for the tolls to dribble in during the next four years to repay him—without interest. "Such was my reward," he says, but adds: "as it was for the benefit of the people, and I had done it for the general or public good, I did not mind it so much, as I would have done, had I done it from any selfish motive."

But the September storm had once again wrecked Ethan's farm, washing away a field of standing grain, tearing down fences, and covering much of his fertile land with sand and gravel. Only Lucy's pluck stood between him and utter discouragement.

Winters at E. A. Crawford's were tough. Ethan's Uncle William Rosebrook recollected times when the snow would sometimes be ten feet deep, and the crust so firm they could drive a team of oxen or horses on it over stumps and fences, and draw their wood home from any place they chose.

During this time Ethan was carrying the United States mail from Conway to Littleton, twice each week. While the Notch road was out of commission it was impossible to go down with a horse, so the men carried it through the Notch on their backs without losing more than one trip.

As with all pioneers in the White Mountains, the forest furnished much of the support of the Crawfords, beyond the income of the inn. No man ever lived who was Ethan's equal in trapping bears, wolves, sable, otter, and lynx and in hunting deer and moose. Through all the stories of his hunting exploits there runs the record of his kindness and his unwillingness to inflict any unnecessary pain. It was always against his principles to keep wild animals in misery when they were in his power, or to try to play with or torment them, except to try their strength; and he would relieve them from pain as soon as possible. Said he: "I considered they had feelings, and were not to blame for the species to which they belonged, therefore . . . I would treat them as well as I could."[3]

Finding a 300-pound bear caught in a steel trap, Ethan quickly put him out of misery with a charge of birdshot square in the face. But then came the job of loading the dead bear on the horse's back, the animal prancing and snorting in terror. Ethan pulled off his coat, blindfolded the mare's eyes, put the bear upon a stump, tied the horse close by, her head to a tree, and then, putting his shoulder under the bear, lifted the heavy creature onto the saddle. Afterwards,

Ethan rolled the bear back of the saddle, loosed the horse, and then mounted, took off the blindfold, and went on home.

While hunting in the fall of 1829, Ethan discovered a beautiful little pond in the wilderness west of Mount Willey, about two miles from the Willey House. To this pond he often took parties for fishing. There they caught large salmon trout in great abundance. The name "Ethan's Pond" was soon attached to this lakelet, which is one of the sources of the East Branch of the Pemigewasset River.

His catch of sable that fall counted up to seventy-five, which yielded him nearly a dollar apiece. He also caught ten bears and drew a bounty of three dollars each, their fur bringing about as much more.

Next summer, for the amusement of his guests, Ethan gathered a little menagerie, including a tamed wolf, a deer, a strutting peacock, a bear, a donkey, and a flock of guinea hens. Ethan also bought a small piece of artillery, which he set up on top of the Giant's Grave, back of the barn. When the air was still and clear the report from the cannon would set up such an echo that some called it "Crawford's homemade thunder."[4]

Travel through the Notch had increased to such an extent by 1828 that Ethan and Abel Crawford decided that another inn was needed above the Gateway. This was handy for visitors to the Flume and the historic old Willey House, and was accessible to Mount Washington by the path which the Crawfords had built nearly ten years before. There were many sightseers, also, who left their horses above the Notch, and made the trip down and back on foot. To meet the needs of the increasing number of travelers, these two pioneers built a hotel 120 by 36 feet, and called it the "Notch House."

Here they installed Thomas J. Crawford, Ethan's brother, the sixth of Abel's eight sons, who married in January 1829 and moved in as manager. The house was new and comfortable; its location (still marked midway between the Crawford House and the Gateway to Crawford Notch—a short distance east of Echo Lake) was romantic, and Tom soon had the lion's share of the winter business. The Crawfords now had the first chain of White Mountain hotels—three in one family—within a distance of twelve miles. Thomas ran the Notch House successfully for many years.

Many an interesting note was left by guests of Ethan Crawford in his hotel register or Album. Among them is this remarkable tribute from

the pen of Mrs. Frances Trollope, the well-known author of *Domestic Manners of the Americans*, manners which she found so generally disappointing: "I cannot forbear stating that I consider Mr. Crawford the most polite, refined, accomplished scholar, the most polished and pure minded gentleman I have met since I left Europe, my native land. Mrs. Trollope, Aug. 21, 1830."[5]

Thirty years later, in the autumn of 1861, her son, Anthony Trollope, visited the White Mountains, and considered much of the scenery "superior to the famed and classic lands of Europe. I know nothing, for instance, on the Rhine . . . equal to the view from Mt. Willard, down the mountain pass called the Notch."[6]

In June of 1831 Ethan Allen Crawford's inn was the stopping place of Daniel Webster, United States Senator from Massachusetts, with his second wife and his daughter Julia. They had paid a visit to his birthplace and boyhood home in Salisbury, New Hampshire, and had driven on to the White Mountains.

It was on a cloudy morning in June that the Webster family carriage drew up at the Crawfords'. Ethan came to the door in his shirtsleeves, placed his hands on the upper casing, and looked out between his arms to find out what was wanted.

"Is your name Crawford?" asked Mr. Webster.

"Yes," was the reply.

"I have called to see if you will go with me today to the top of Mount Washington."

"No!" said Ethan. "In the first place, it's too late in the day; then the weather isn't suitable and you wouldn't see anything if you went."

"Mr. Webster," interposed the statesman's wife, "perhaps we had better stop over until it clears up."

For an instant Ethan stood spellbound. He was an ardent Federalist in politics and Webster was his idol. Taking down his hands he stepped from the doorway and asked: "Is your name Webster?"

"That is my name," came the answer.

"What Webster? What's your Christian name?"

"They call me Daniel."

"Daniel Webster, I'm glad to see you!" cried Ethan, stepping to the carriage door with hand outstretched. "Give us your hand! Get out and come in. I'm ready to go to the top of Mount Washington or to the ends of the earth with you, today or any other day you may choose."

"It is needless to say," observes the chronicler, "that they 'stopped over.' "[7]

Next day dawned clear and mild, and Ethan proudly guided his guest to the top of Washington. "We went up without meeting anything worthy of note, more than was common for me to find," says Ethan. "But to him things appeared interesting."[8] They found it decidedly cold on the summit, so made only a short stay, but long enough for the orator to address the mountain thus:

Mount Washington, I have come a long distance, have toiled hard to arrive at your summit, and now you seem to give me a cold reception, for which I am extremely sorry, as I shall not have time enough to view this grand prospect which now lies before me, and nothing prevents but the uncomfortable atmosphere in which you reside![9]

Before Ethan and Daniel could turn their backs on the summit a brisk fall of snow bade them make haste and the flakes even froze to their garments before they reached a milder zone. Back safely at the inn, Mr. Webster had an interesting story of his climb to tell the ladies. On their departure next morning, Ethan relates that, "After paying his bill, he made me a handsome present of twenty dollars."[10]

During the summer of 1832 Ethan Crawford's Album recorded the visits of a number of celebrities. On 14 July Ralph Waldo Emerson[11] was at the Crawford Inn. Ten days later came another party, consisting of Washington Irving, the Count de Pourtales, and the English traveler, Charles Joseph Latrobe, author of *The Rambler in North America*, a work inscribed to Irving.[12]

Among the writers who visited Ethan Allen Crawford's inn was Nathaniel Hawthorne, who in September 1832 climbed Mount Washington. From this visit came several of Hawthorne's stories, among them "The Great Stone Face" and "The Ambitious Guest." In the sketch "Our Evening Party among the Mountains," Hawthorne tells of his stay at Crawford's and of Ethan's tale of the last recorded treasure hunt on Mount Washington, which the writer later expanded into his tale, *The Great Carbuncle.*[13]

Harriet Martineau, noted English writer, who visited the mountains the following September, left this pleasant picture of the Crawfords and their inns:

The Crawfords, who live twelve miles apart, lead a remarkable life, but one which seems to agree well with mind and body. They are hale, lively men, of uncommon simplicity of manners, dearly loving company, but able to make themselves happy in solitude. . . . The elder Crawford has a pet album, in which he almost insists that his guests shall write. We found in it some of the choicest nonsense and "brag" that can be found in the whole

library of albums. We dined well on mutton, eggs, and whortleberries with milk. Tea was prepared at dinner as regularly as bread throughout this excursion.[14]

Of Ethan she says: "All travellers in the White Mountains know Ethan A. Crawford's hospitality."[15]

Among other notable entries in the Crawford albums are these:

August 3, 1835, James Russell Lowell [the poet], then in his sixteenth year, in company with Judge Putnam of Boston and others.

[U. S. Senator] Chas. Sumner of Boston, Mass. Sept 15, '36—ascended Mount Washington.[16]

During the first half of the twentieth century, winter ascents of Mount Washington became increasingly numerous, but before the establishment of the weather observatory in 1870 these visits to the summit were few indeed.

As far as records show, the first winter ascent was made in 1836. The last entry of that year in the White Mountain Album, Ethan Allen Crawford's hotel register, is this:

Dec. 4, 1836 Sunday Eve

C. C. Mason)
of and from Bangor
N M Adams)

Arrived at Mr. Crawfords last eve ½ past 11 o clock—visited Mt. Washington to day—found the snow three foot deep—the day has been uncommon mild and pleasant. We enjoyed the prospect much—to-night we go to Gould's. Farewell Kind and pleasant Hosts—May the choicest blessings of Heaven be yours is the sincere wish of your friends

C. C. Mason
N. M. Adams[17]

Trouble came soon to the Crawfords through the opening of a competing hotel a mile away, which was later enlarged and took the name of the White Mountain House. Through the next few years the competition was keen and the Crawford *History* bristles with complaints of unethical and unneighborly acts on the rival's part. This new innholder, one William Denison, tried by misrepresentation to deprive Ethan of his postmastership. In this he failed, as Phineas Rosebrook and the other neighbors for miles around rallied to Crawford's side. Denison also tried to steal the use of Ethan's road to the mountain. Failing in this, he built a new path over the side of Mount Deception and came into the old road well away from Crawford's Old Moosehorn

Tavern, as the inn on the Giant's Grave came to be called. Then he advertised that he had built a shorter route to Mount Washington.

But worse than this was Lucy's serious illness after the birth of her ninth child in April 1834. For several months she was an invalid until the arrival in July of Dr. John Collins Warren, distinguished Boston surgeon, and his wife, former guests and friends of the Crawfords. Under the doctor's treatment, for which he refused any payment, she soon recovered.[18]

Carrying a heavy load of debt, Ethan faced more trouble when Denison lured stage drivers to his hotel by the promise of free feed and care for their horses. Then in riding down the Cherry Mountain highway, his horse slipped and Ethan suffered a serious internal injury. He refused to be operated on, fearing that this would surely kill him, and through the winter of 1834–35 he continued in poor health.

In the spring a speculative land boom caused Ethan to receive an offer of $10,000 for his place on an option to run for six months. On the strength of this he turned down an offer of $12,000, but through trickery the proposed deal fell through. Then with the boom at an end he found it impossible to sell the place even to satisfy his creditors.

Through the following winter his health grew worse, and he was attacked by terrible pains. Through Dr. Bemis of Notchland Ethan was visited by a Dr. Rodgers, a New York surgeon, who operated successfully, and without charge.

Then came the creditors, forcing him to surrender his personal property, "even to the last cow," and having Ethan thrown into jail in Lancaster where, sick and emaciated, he was kept for twenty-five days. The persecution was utterly needless, for the debts were amply secured and were paid in full after his release. With all their property gone, Ethan and Lucy with their children removed early in 1837 to Guildhall, Vermont, the former home of his parents and grandparents. There they spent six busy years.

Ethan had learned the mason's trade while helping to build his own inn and barns. And he now put the trade to profitable use, earning, as he said, "my dollar a day when I worked at my trade."[19] One of the farms on which they lived, first without rent and later on fifty-fifty shares, was the one Grandfather Rosebrook had started to clear from the wilderness fifty years before.

But with all the comforts the Crawfords found in the rich farmlands around Guildhall, there was always a sense of sadness when they thought of the old home on the Giant's Grave where they had fought

for their very existence through twenty toilsome, often discouraging, but withal happy, pioneering years. But there was one bright spot in the picture. At the foreclosure sale 16 March 1837, when the property was taken over by the three men who had been sureties on the mortgage, the Crawfords had expressed their sorrow at leaving the place where they had labored "and had done everything to make the mountain scenery fashionable, and had just got in a way to make ourselves comfortable, and to be able to make our friends feel at home." One of the new owners answered that "fifty years hence it will be as in old time; there would be those rise up who knew not Joseph, and it would not then be known who did all these things."[20] But another of the group said: "Mrs. Crawford, you have kept a journal of your life here and of the things that have happened that nobody else knows so well. You can write a history of the White Mountains that people will be glad to buy, and if you will make good to us what we have to pay out, with interest and expense, you shall have your place back."[21]

With this encouragement, Lucy undertook the task, and in the spring of 1845 *The History of the White Mountains from the First Settlement of Upper Coos and Pequaket* was published. Without realizing it, Lucy did great service to the White Mountains by recording the events of that period that otherwise would have been lost.

Soon after the foreclosure in 1837, the Crawfords' old inn was purchased by Horace Fabyan, a provision dealer in Portland. He was an experienced landlord, who enlarged the house several times and gave it the name of "Mount Washington House." Travel was increasing, and at first Fabyan prospered. Copying one of Ethan Crawford's ideas for entertaining guests, Fabyan bought a six-foot tin horn, and every evening led his guests out into the twilight while he raised the echoes with the blasts of his horn.

During these years Ethan's brother, Tom Crawford, was doing well in his hotel at the Gateway to the "Great Notch," as it was then called. Among the interesting guests he served was Henry David Thoreau, who, in September 1839, with his brother John, was making his first visit to the White Mountains. The young men journeyed by boat up the Merrimack River to Hooksett, New Hampshire, where they continued to the mountains on foot. Reaching Tom Crawford's on the eighth, they stopped for a few days, making the ascent of Mount Washington on 10 September. Like Emerson, Thoreau calls the mountain "Agiocochook."[22]

His journal of the trip, his first literary venture, was titled *A Week*

on the Concord and Merrimack Rivers. On "Thursday" in the *Week*, he writes:

> Wandering on through notches which the streams had made, by the side and over the brows of hoar hills and mountains, across the stumpy, rocky, forested, and bepastured country, we at length crossed on prostrate trees over the Amonoosuck, and breathed the free air of the Unappropriated Land. Thus in fair days as well as foul, we had traced up the river to which our native stream [the Concord] is tributary, until from Merrimack it became the Pemigewasset that leaped by our side, and when we had passed its fountain head, the Wild Amonoosuck, whose puny channel was crossed at a stride, guiding us toward its distant source among the mountains, and at length, without its guidance, we were enabled to reach the summit of Agiocochook.[23]

In July 1858 Thoreau made a second visit to the White Mountains, this time with Edward Sherman Hoar, brother of Thoreau's friend, Elizabeth Hoar, and of the United States Senator, George Frisbie Hoar. They were joined in their camp in Tuckerman Ravine by two Worcester friends. Thoreau had a habit in mountain climbing of following his own path in a straight line to his objective. Descending through the ravine, he found one difficult spot, a narrow portion of snow, which was "unexpectedly hard and dangerous to traverse," and in crossing which he "tore up" his finger nails in efforts to prevent sliding too swiftly down its steep surface. "It is unwise," says he, "for one to ramble over these mountains at any time, unless he is prepared to move with as much certainty as if he were solving a geometrical problem."[24]

This second visit was made for the purpose of studying the vegetation of the mountains, upon which he reported at length in his *Journal.* Thoreau loved the mountains for their wildness and natural beauty and ruggedness. He deplored the attempts of hotel keepers to "make smooth a path in the wilderness," and reported with disgust that: "I heard that Crawford's House was lighted with gas, and had a large saloon, with its band of music, for dancing. But give me a spruce house made in the rain."[25] But that is getting ahead of our story.

On 2 October 1835 Tom Crawford hired a seventeen-year-old youth named Joseph S. Hall to work around the Notch House in winter and guide parties to Mount Washington in summer. Hall, a nephew of "Judge" Linus Hall of Bartlett, had had etched on his memory the terrible night of the Willey Slide when the Hall family were evacuated from the path of the raging Saco River. Now that he

had started work as a mountain guide, Joe came to realize how difficult was the trip to Mount Washington and how dangerous it was to take parties to the summit with no shelter from the severe storms they often encountered. Consequently in the fall of 1839 he persuaded Tom Crawford to permit him to build a bridle path to the summit of Mount Clinton, and in the following year to extend it to the top of Mount Washington.[26]

In late summer the path was opened for use. Appropriately, Tom's father, Abel Crawford, then seventy-five years old, rode the first horse to reach the summit. In the party, besides Tom and Abel, were Dr. Charles T. Jackson, State Geologist and director of the first geological survey of New Hampshire, and his two assistants. On reaching the summit Abel Crawford exclaimed: "To think that a horse stands on the Summit of Mount Washington!"[27]

From the opening of the Crawford Path, horseback parties to Mount Washington were a daily event, bringing many who mounted a saddle for the first time to ride in more or less comfort up the rough trail.

Shortly after Tom opened the Crawford Path to horses, Fabyan widened and improved Ethan's 1821 path, so that now there were two means of reaching the summit of Mount Washington on horseback. Fabyan's next improvement was opening a road for vehicles from his inn to the present site of the Base Station, leaving the highway about half a mile east of his hotel. It was seven miles by road to the base. From there the path rose nearly 4000 feet to the summit in a distance of about two-and-a-half miles, or approximately one foot in every three.

This Fabyan Path became one of the principal routes to the top of the mountain. In its busiest days as many as a hundred visitors made the ascent. With the building of the railway it fell into disuse, though I remember hearing my father tell of seeing a group of riders at the summit in 1878. Four members of the Littleton (New Hampshire) Riding Club made a horseback ascent of the Crawford Bridle Path on 1 September 1932. And then on 25 July 1933 Miss Lillian H. Judd of Waterbury, Connecticut, rode Big Boy from Jackson to the Glen House, and thence to the summit. She made the climb up the carriage road in three hours.

It must have been soon after opening the path that Fabyan built a stone house for the safety and comfort of his guests near what is now the Gulf Tank on the cog railway. Just south of the tank, my father, brother, and I, in 1901, discovered a hollow square of piled-up rocks

that looked like the foundation of some forgotten building. Its ruined and moss-grown walls indicated its antiquity.

At first my father thought it was the foundation for a small cabin used by the workmen building the railway in 1868, known as "Mike's House," for the foreman Michael Mullarvey—later dubbed the Gulf Station-House. But months afterwards, in William Oakes's *Scenery of the White Mountains*, my father read: "We must not here omit to notice the very grand and peculiar scenery of the Great Gulf, a vast hollow between Mount Washington, and the northeastern mountains, Clay, Jefferson, Adams, and Madison. Leaving Fabyan's old road at the ruined stone house, and passing for a few rods towards the north, you suddenly arrive at the brink of the Gulf."[28] When Oakes wrote in 1848, Fabyan's stone house had evidently already fallen into ruin.

After Ethan Crawford built the three little stone cabins on the summit and then put up the big tent that was no match for the prevailing wind, no mention of a shelter on top of Mount Washington is found till 1841. During the first week of September, Edward Everett Hale, on his first visit to the mountain, found on the summit a rude wooden shack about twelve feet square. Hale, then a theological student, was working as assistant on the state's geological survey. After a tramp of seventeen hours over the Northern Peaks, he arrived at the shack at ten o'clock at night, and forced his way in with a crowbar to spend the night. This little shanty is mentioned again in 1844, but must then have been blown off the mountain.[29]

One might think that, after all the hard work, the troubles, and the heartaches that Lucy and Ethan Allen Crawford had suffered during their many years in their old inn, the comparative peace and quiet of the lovely farm lands of Guildhall, Vermont, would have been a source of contentment and happiness. But the old pioneer spirit could not be denied. In the spring of 1843, only six years after they had lost their former home by foreclosure, the hotel of their old rival, Denison, only a mile from their own beloved inn, was on the market. Quickly they rented it, returning hopefully, and drawing as guests many of their old friends as well as new ones.

Ethan Crawford's health seemed much improved. But his giant strength had been sapped by his superstrenuous work from boyhood. He had lost his powers of resistance. Slowly but surely his health gave way, and on 22 June 1846 Ethan Allen Crawford, the "Giant of the Mountains," the man who gave his strength and his life to make

Mount Washington known and loved by thousands of visitors, gave up the struggle. Of his last moments Lucy wrote: "No groans or struggles convulsed his frame, but weary with the sorrows and burdens of life he sank away as happy as a common laborer sinks to his soft couch of repose."[30]

On a knoll that rises to the left of the road to the Base Station, about half a mile from the Fabyan station, William Oakes, the "Botanist of the White Hills," placed a gravestone of white marble, with this inscription:

In Memory of Ethan Allen Crawford who died June 22, A.D. 1846; Aged 52.[31] He built here the first Hotel at the White Mountains, of which he was for many years the owner and Landlord. He was of great native talent & sagacity, of noble, kind, & benevolent disposition, a beloved husband and father, and an honest & good man.

Lucy, his faithful and long-suffering life partner, survived her husband twenty-three years, and died 17 February 1869 at the age of seventy-six, and was buried at his side.

With the death of Ethan Crawford, the family's pioneer chain of summer hotels was definitely broken. His father, Abel, lived for five years longer, his hotel business prospering with the coming of a regular stage line and the increase of pleasure travel. Some time before 1820 his early home gave way to a comfortable hotel, named the Mount Crawford House[32] after the peak that overshadowed the inn and that still perpetuates Abel's name. Later, the hotel was run by Nathaniel T. P. Davis, who married Abel Crawford's only daughter, Hannah. The hotel was last opened to the public in 1872 and 1876, and was torn down in 1900.

Davis was so impressed by the success of Tom Crawford's bridle path that, in 1845, he opened what is now known as the Davis Trail. This fourteen-mile toll route climbed from Abel Crawford's old hotel up Mount Crawford and along the Montalban Ridge (the eastern border of Crawford Notch) to join Tom's path on Boott Spur. The cost of the trail was heavy and the returns poor. Davis borrowed heavily from Dr. Samuel A. Bemis, the Boston dentist who, since 1827, had made first his summer home and later his permanent residence in Hart's Location, at what is now known as Notchland, near the Mount Crawford House. It was finally necessary for Dr. Bemis to foreclose, and take over the hotel and other property from Davis. The path was

abandoned about 1853, and became nearly impassable, until restored by the Appalachian Mountain Club in 1910.

Abel Crawford died in his eighty-fifth year, on 15 July 1851. His life spanned the era from the buckskin-clad pioneer in his lonely log cabin to the fashionably-dressed city visitor and the comfortable summer hotel. Though he outlived his son Ethan Allen, it was the latter who probed deeper into the possibilities of Mount Washington as a summer Mecca. Following the example of his father, Ethan established himself as perhaps the greatest of all guides to this, New England's crowning peak.

One of Abel's guests, who became his staunch friend and admirer, was Thomas Starr King, one of the most brilliant orators and moving preachers the famous pulpits of Boston ever heard.

Starr King was first led to visit the White Mountains through reading an article by his old friend the Reverend Doctor Hosea Ballou, one of the founders and the first president of Tufts College (now Tufts University), who first visited the White Mountains in 1844.

King came to the mountains in his twenties to rebuild the health and strength which his crowded life yearly sapped nearly to the breaking point. More than any other writer of his time, Thomas Starr King, through the story of his journeyings in the White Mountains as told in a series of letters to the *Boston Evening Transcript*, made the mountains popular as a summer resort. These letters, revised and illustrated, became his famous volume, *The White Hills—Their Legends, Landscape and Poetry*,[33] which brought thousands of summer visitors to our Northern mountains.

Starr King is most remembered as the eloquent preacher and orator who spent himself unceasingly, addressing meetings from one end of California to the other to arouse public sentiment to keep that important territory in the Union during the War Between the States. Yet his name is inscribed indelibly among the White Mountains in Mount Starr King, the four-thousand-foot mountain that rises above the village of Jefferson, and in King Ravine, that huge gash in the side of Mount Adams, one of the few places in the White Mountains where a deposit of ice is found throughout the year. Mr. King and his friends were the first to explore this fascinating ravine. His name is also memorialized in his adopted State of California in Mount Starr King in the Yosemite Valley.

4. Dolly Copp and the Glen House

ALTHOUGH the Crawfords in the early 1800s were making the valley to the west of Mount Washington popular with tourists, it was not until 1827 that anybody had the hardihood to settle in the wilderness on the eastern slope of the great mountain, then known as the "Eastern Pass," now "Pinkham Notch" or "The Glen."

Even the early owners of the Glen made no effort to settle there. During the French and Indian Wars Thomas Martin served the English Crown so faithfully as a purchaser of military stores for the British army that King George III in 1775 deeded to him a tract of land in the Glen along the banks of Peabody River.[1] Contained in Martin's Location is the now famous Dolly Copp Camp Grounds five miles south of Gorham on the Glen Road.

Jackson, the first town near the lower end of Pinkham Notch, was first settled by Benjamin Copp, in 1778. The original name given the town was New Madbury, for the early settlers came from Madbury, New Hampshire. In 1800 the town was incorporated as Adams. Some years later its name was changed to Jackson, all of its voters but one being for Jackson, when the question was whether he or Adams should be president.[2]

Little is known of Copp and his family. They lived entirely alone in a vast wilderness for twelve years before any other inhabitants joined them. Then in 1790, a year before Abel Crawford moved into Nash and Sawyer's Location, Captain Joseph Pinkham, of Madbury, with four neighboring families, migrated to New Madbury and its rich lands on the lower part of Ellis River.

But the real pioneer of what was to become Pinkham Notch—the

Granite House Register

Date	Name	Residence	Destination	Rooms
July 31	L. Wilkins & Lady	Boston		
"	S. G. Keyes.	Keene N.H.		
"	Timothy Colony.	do	do	
"	Henry Colony.	do	do	
"	Alfred S. Colony.	do	do	
"	Lt. H. Briggs.	do	do	
	Charles Haines		New Bedford	
	Louis Agassiz		Cambridge Mass	8
	Benjamin Peirce		" "	13
	C. C. Felton		" "	11
	Arnold Guyot		" "	8
	George P. Bond		Cambridge	15
	Alex. Agassiz		" "	8
	Ernest Sandoz		" "	8
	Franklin E. Felton		" "	11
	S. M. Felton		Charlestown "	11
	Geo W. Cutler Mrs		Concord N.H.	15
	Col L. Wise Lady & Child		New York	3
	John Kendall & Sister		Washington City	
	& Miss Haddock.		Hanover N.H.	
	J. S. Gilbert Lady & son		Boston	
	W. Clough		Hanover N.H.	
	G. A. Freeman		Boston & Evening	
	F. A. Brune		N. Y. Home	
	[illegible]		[illegible]	
	Rev Mr Sargeant Wife & 2 children		Brandon Vt.	
	John C. Kane		Westchester County	Ills.
July 31	E. T. Rowe & Lady		Derry N.H.	Lancaster N.H.

This party of Harvard scientists headed by Louis Agassiz registered at the Granite House in Littleton on 30 July 1849 on their way to Mount Washington.

The Glen House as enlarged in 1870. Toll House on carriage road at right.



Coach starting down Pinkham Notch from the old Glen House.

man who, single-handed, hewed a home out of the virgin forest—was a young fellow twenty-four years of age, small of stature, with bent, sloping shoulders, a shapely head under a curling shock of yellow hair, pale blue eyes set deep under shaggy brows, a sound heart in a barrel chest, and long arms with rippling muscles. Born in 1804, in Stowe, Maine, near the New Hampshire line, Dodifer Hayes Copp was the son of Lieutenant Samuel Copp of Lebanon, Maine, and the former Hannah Hayes. Christened "Dodavah Hayes Copp," he later changed the spelling to "Dodifer." Most generally he was known as Hayes, or "Haze," by his intimates. Whether or not Hayes Copp was related to Benjamin is uncertain.

Hayes Copp, before he was twenty, had made his way through Fryeburg to the blooming farm lands of Bartlett and Jackson. There he heard tales of the rich black soil seventeen miles up the notch from Jackson, where wealth was waiting only for the axe, the torch, and the plowshare.

Even then young Copp was a hard, unyielding man, whom neither hardship nor danger could turn from his determined course. Negotiating with the New Hampshire Legislature, he secured a deed to a future farm in the forest lands of Martin's Location. In place of money, of which he had none, the boy pledged wheat, oats, and barley, to be raised when the land was ready, and which through years of toil he paid to the last bushel.

It was in 1827 that Hayes Copp, a pack on his back, his long-barreled flintlock gun over his shoulder, his axe in his hand, set off up the blazed trail that followed the Ellis River up the Notch and then went down the Peabody River, crossing the stream where later was built the Dolly Copp Bridge, since removed. Somehow he found the surveyors' blazes on the trees, telling him that here along the river was the land which was to be his farm and home. And here he built his shelter, a lean-to of poles, roofed, and walled on three sides with strips of hemlock bark. In front of the open side he built a great fireplace of flat stones—his cook stove and his only source of warmth through the long winter nights that lay ahead of him.

Food was abundant: trout in the brooks, bears in the berry thickets, deer coming morning and night to drink in the river, and game birds aplenty. Salt pork, Indian meal, salt—the pioneer's priceless commodities—he traded for on infrequent trips to Jackson, carrying down in exchange the furs he had dressed.

In the Glen the summer is short. The snow lies late into the spring

in this deep valley, and comes again early in winter. Those few weeks of warm weather between snow and snow were filled with grinding toil, felling, piling, and burning the great trees. The second spring Hayes "scratched in" round the blackened stumps in his little clearing turnip and pumpkin seeds and perhaps a few patches of wheat. The black soil, the humus of ages of fallen leaves, awoke in the sunshine and gave the toiler a harvest.

Where a butternut once shaded the road, the young man "rolled up" a one-room log cabin, and a little nearer the river a log barn for the sheep and cows he hoped soon to buy. No one driving up the smooth road from Jackson to Gorham can picture the savagery with which nature fought back at this invader of the Glen. It took from three to five years for him to wrest from the wilderness a farm and a home. Then he was ready for a helpmate.

On one of his rare visits down the notch Hayes had met Dolly Emery, a girl just his own age, small in stature, with flaxen hair, light blue eyes that had a flash of keenness, and a glib tongue. They were married in Bartlett 3 November 1831.

In 1824 Durand, six miles beyond the mountain wall to the west, was incorporated as the town of Randolph, known for its prosperous farmers and lumbermen. To link Randolph with Jackson, early in the thirties the legislature of New Hampshire made a contract with Daniel Pinkham to build a wagon road along the old blazed trail. It was rough going, a work of several years, with few laborers and fewer tools. It taxed the resourcefulness of the man who, as a boy, had taught his pig to haul a sled, but he carried it through. Daniel received a grant of land on both sides of the road, extending from just above Glen Ellis Falls to Emerald Pool in the Peabody River, and embracing the present-day site of the Appalachian Mountain Club's Pinkham Notch Camp, the Notch having been given its name from this grant. So the road came to the Copps' farm, and made just a bit lighter the life of this man and woman whose perfect health, great strength, and unconquerable will fitted them for the everlasting battle to enlarge their clearing and make for themselves and their flocks more lands to till and wider pastures for grazing. As George Cross tells us:

> But they needed all their strength and pluck to fight the bears from the young lambs in spring, the wolves from the young cattle in the fall, the foxes, coons and skunks from the poultry yards, the deer from the ripening grain. They must expect the late and early frosts of the too-short summers. They must face the intense cold, terrific winds and deep snows of the always

long winters. And they well knew that every year the fight with some of these enemies would be a losing battle.[3]

But year after year their farm and their flocks increased. The one-room log cabin gave place to a long low frame house, neatly painted and connected by an ell with a roomy frame barn.

As for Dolly Copp's part in this household—in the spring she saw to the setting of the hens and raised fine broods of chickens. She helped Hayes shear the sheep, cleansed and carded the wool, spun the snowy rolls into yarn, wove the yarn on her clumsy loom into cloth or knit it into socks for the whole family. In the corner of the ell room stood the brass kettle in which in the fall she made hundreds of "tallow dips." Ranged along the barnyard wall were the barrels and tubs, and the kettle swung over the outdoor fireplace where in the early spring she made the year's supply of soap. In the winter evenings, by the light of her tallow dips burning on the light stand before the fireplace, she knit or darned and made or mended the garments of the whole family.

A tradition says that Joseph Jackson brought on his back from Canterbury, New Hampshire, a sackful of little apple trees to grow into the first apple orchard in Shelburne Addition (now Gorham). Dolly's orchard, now rows of gnarled and decaying tree trunks, was started not long after Jackson planted his first trees. But she found her trees in the woods along the river banks, the "Johnny Appleseed" trees that grow everywhere. From the "wildings" she selected the best, and by care and cultivation they grew to great size and bore apples of many fine varieties.

During the forty years that the Pinkham Notch road was the only highway from Jackson to Randolph, the Copps' home served as an inn for the wayfarers who stopped for a meal or for the night. Dolly's comfortable beds and good food became widely known. The price was "a shilling all round"—that is, twenty-five cents for a meal, the same for a bed for each person, and a quarter for the feed and care of a horse.

In 1836 Shelburne Addition became the town of Gorham. A good wagon road took the place of the old blazed trail from the Copp farm to this prosperous town. In 1852 the Atlantic & St. Lawrence Railway (operated first by the Grand Trunk Railway and now a part of the Canadian National System) connected Gorham with Portland. At the same time the Boston, Concord & Montreal Railway pushed up as far as Conway. Daily mail stages started running through Pinkham Notch between these two mountain towns.

A little earlier, a family of English descent by the name of Barnes built their home and farm a quarter of a mile up the Randolph road from the Copps'. Soon after, Patrick Culhane took up a claim about midway between the Copp and Barnes farms. Across the river in Green's Grant had settled Frederick and Sally Spaulding with their four lively youngsters, who were a little older than the Copp children. After so many years of neighborless isolation, the pioneers of the Glen were to know neighbors and human friendship.

Mail coaches and trains meant travelers. In 1852, quick to see the future possibilities of the Glen, came John Bellows to build the first hotel at the eastern base of Mount Washington.

Colonel Joseph M. Thompson, who in 1853 succeeded John Bellows as owner of the Glen House, had learned the hotel business as proprietor of the Casco Bay House in Portland, Maine. At the time of his purchase at the Glen he was living in New Gloucester, Maine. Under his genial and able management—aided materially by the excellence of Mrs. Thompson's cooking—the Glen House became increasingly popular, and required enlargement.

Dolly was ready to reap her own harvest from this new summer-visitor business. Her own little inn was full of city folk summer after summer. And besides she found a ready market at the Glen House for her bolts of woolen homespun, her yards of linen, her dyes of delicate blue, and her golden butter, rich cheese, and maple syrup.

Among summer folk there was a belief that the one perfect view of the profile on Imp Mountain, then becoming known as "Dolly Copp's Imp," was to be had in the dooryard of the Copp farm. So the great six-horse stages, as they rolled along the Glen road laden inside and out with eager sightseeing visitors, usually turned aside, crossed the river, and drew up before the Copp home. There the smartly-dressed vacationers divided their attention between Dolly's Imp, standing out clear against a screen of white cloud, and Dolly herself and her modest family gathered shyly about, the father with his pinched, hard face wearing the grim smile of years of endurance, Dolly standing in the doorway, clad in her pale blue dress of homespun, nervously fingering her gold beads, pretty Sylvia shyly peering out over her mother's shoulder, small Daniel clinging to his mother's skirts, Jerry and Nat modestly answering a babel of questions. Thus the name and fame of Dolly Copp and her family went forth throughout New England and far beyond.

One of Colonel Thompson's early improvements was the building

of the Glen Bridle Path up Mount Washington, climbing to the summit in seven miles by the ridge on which the carriage road was afterwards built. The zigzag route of the path through the woods for the first few miles has long since been wiped out and forgotten, but between the Halfway House and the summit much of its course may still be traced, some portions in a deep trench among the rocks, others in thickets of scrub. Within a mile of the top it crossed a broad, grassy area called the Cow Pasture, where are still seen the stone walls of a corral in which cows were kept during one summer before 1860 to supply the Tiptop House with milk.

For the stage lines to Gorham and North Conway and for riders on the Glen Bridle Path, Thompson needed a large number of horses. In his great stable at New Gloucester he kept a splendid array of animals, and their departure for the mountains early each summer was one of the great events of the village. A long rope was laid along the principal street, a pair of fine horses harnessed as leaders at one end, with a rider on one of them. Then at regular intervals the remaining horses were tied to the rope in pairs, one on each side, a carriage with driver bringing up the rear. As there were as many as a hundred horses in all, they were divided into several bunches, each group tied to a long rope. It is said that the cavalcade would be two or three days in reaching the Glen House.

Landlord Thompson had much of the showman in his make-up. His big Concord coaches of the tallyho variety, which met the Grand Trunk trains at Gorham, were drawn by eight perfectly matched white horses. His expert driver had his arrival so timed that just at the moment the passengers commenced to alight from the train at the Gorham station, they were surprised and fascinated by the sight of the great coach, often loaded with departing guests, sweeping in a great circle up to the platform, the eight beautiful horses on a full gallop, brought to a standstill directly in front of the train.

Colonel Thompson continued to run the Glen House with increasing patronage until his death by drowning in 1869 during a terrific rainstorm and flood in the Peabody River.

In December of 1874, their children having married, Dolly and Hayes Copp once more were left alone in the home they had fought so hard to build in Martin's Location. The wilderness was tamed. Their work as pioneers was finished. They were approaching the Golden Jubilee of their marriage. It would have seemed a fitting time for relaxing and contentment and joy. But this couple were like sunlight and

storm. Dolly was a dynamo of happy energy, her twinkling blue eyes seeking needs for service her ready hands might perform, her wide mouth turning up at the corners in mirthful appreciation of the fun of living.

But Hayes was a dour character who, in all his life, had never had time for fun. His gimlet eyes were always boring into some problem that was to mean hard, laborious work. His forehead was puckered up above his hawk nose, while his straight bitter lips slanted downward at each end towards the unrelieved hardness of his jaw. There is no story told of Hayes being unkind to his family, but it was not in such a nature to be sympathetic or kindly or to have the least fun in life. And it is not mere coincidence that an old timer in Gorham recalled that "Haze Copp was the meanest man I ever knew in all my life."

Dolly was not one to speak ill of any one, least of all of her husband of fifty years. All she told her friends was: "Hayes is well enough. But fifty years is long enough for a woman to live with any man."[4]

So, without rancor, and with scrupulous care, they divided between them the savings of a lifetime. Leaving the fields, the orchard, and the garden they had made together, they separated and went their chosen ways. Hayes returned to his native town of Stowe, while Dolly found a home with her daughter Sylvia in Auburn, Maine. There, far from each other, and far from the scenes of their life work, they lived out their remaining years.

It was in 1915 that the Federal Government added to the White Mountain National Forest the old farms in the Glen, and laid out the Dolly Copp Recreational Area, which has become a favorite vacation spot for hundreds of campers. In the spring of 1951 it was placed under the management of the Appalachian Mountain Club, to become another feature of its unique public service to campers. In 1957 the United States Forest Service again assumed operation of this area.

In 1933 citizens of Gorham joined to erect a monument to the memory of Hayes and Dolly Copp, the Pioneers of the Glen.[5]

This might seem to be the end of the pioneering era for Mount Washington. The Crawfords, with their three hotels and two bridle paths, had made life comfortable for the tourist at the western base of Mount Washington, and seemingly safe for the visitor to the summit. And on the eastern slope the Copps had paved the way for the era of gracious living that was to take the place of the rigorous hardships through which they themselves had tamed the wilderness.

Nature is not that easily tamed. But with machines taking the place

of hand labor, and much of the American wilderness giving way to the lumberjack and the settler, an age was on its way in which the challenge of the mountain itself no longer appeared to be a grim life-and-death struggle, but a daring competition, the stage for which had been set by those pioneers.

PART II

The Mountain as Competitor

5. The Golden Age

DURING the "Golden Age of the White Mountains," as Dr. Frederick Tuckerman called the years 1840–60, many artists frequented the mountains. In 1846 Chester Harding painted Abel Crawford. Casilear, Kensett,[1] Durand, and Champney (who settled at North Conway in 1854) were busy in perpetuating on canvas the ever-changing light and hue of clouds and mountains.

"In 1851 B. G. Stone painted Crystal Cascade, which he named the Crystal Falls, and Samuel Coleman . . . 'The Grand Gulf,' a painting much admired by Starr King . . . Daniel Huntington painted 'Chicorua Peak' [about 1860], and George L. Brown his [canvas of the Presidential Range] . . . 'The Crown of New England,' . . . which was painted from Martin's Farm, near the site of the old Mount Adams House, Jefferson Highlands."[2] We hear of one of Benjamin Champney's paintings in a letter from Starr King to Randolph Ryer, his friend and tramping companion in the White Mountains, in which King writes: "Such a New Year's present as I have had! Champney's great picture of the White Mountains!"[3]

A work of this period to which all later map-makers are indebted is the beautiful sketch map of the White Mountains published in 1853 by Professor George P. Bond of the Harvard College Observatory. This contains a table of heights, bearings, and distances, and five lithographs from drawings by Benjamin Champney. In 1860–61 there appeared Henry F. Walling's topographical maps, made from actual surveys of the northern counties of New Hampshire—Coos, Grafton, and Carroll—embracing the White Mountains.

Mount Washington literature is rich in poetry. Among those who visited the mountain during the Golden Age, and whose mountain

poems reflect the beauty and the grandeur of Mount Washington's many moods, are John Greenleaf Whittier, often called the "poet of the White Mountains"; Edna Dean Proctor, New Hampshire's informal poet laureate; Ralph Waldo Emerson; Lucy Larcom, who made many a summer visit to the summit; Celia Thaxter; and Edward Augustus Jenks.

Whittier first visited New Hampshire in 1835 in connection with his antislavery activities. Early in the forties he journeyed by stagecoach through the Notch, stopping to climb "old Agiochook." About 1856 he published in *The National Era* the poem "Mary Garvin," beginning, "From the heart of Waumbek Methna, from the lake that never fails."[4] Another of his early poems, "In the Crystal Hills," from "The Bridal of Penacook," shows his familiarity with early White Mountain names and with the account of John Josselyn's early ascent, as well as with Horace Fabyan and his famous six-foot tin horn:

> We had passed
> The high source of the Saco; and bewildered
> In the dwarf spruce belts of the Crystal Hills
> Had heard above us, like a voice in the cloud,
> The horn of Fabyan sounding; and atop
> Of old Agiochook had seen the mountains
> Piled to the northward, shagged with wood, and thick
> As meadow mole-hills,—the far sea of Casco,
> A white gleam on the horizon of the east. . . .[5]

Many famous geologists have studied Mount Washington. Outstanding among them was President Edward Hitchcock of Amherst College, who visited the mountain in 1841. He was the man of whom the English scientist, Sir Charles Lyell, is said to have declared: "He knew more of geology and could tell it better than any other man I have met on this side of the Atlantic." Hitchcock's visits to Mount Washington and ten years later to the Great Haystack (later changed to Mount Lafayette) were described in a series of articles in the Boston *Recorder* on the geology and scenery of the White Mountains.

But not all the newsworthy visitors to Mount Washington have been as agreeable to meet as were the poets and scientists and guides. One of the most bizarre chapters in the story of the mountain was written in June 1851 when a religious fanatic, John Coffin Nazro, became, as he believed, the owner of the top of the mountain, through a deed given him as a joke by Thomas J. Crawford, who never did own the

land in question. This gave to Nazro "all the privileges and appurtenances to the same belonging."

Thereupon he erected gateways upon all the bridle paths leading to the peak, and demanded one dollar as toll from every person who ascended. He also published in the newspapers of the day this flaming announcement:

PROCLAMATION FOURTH OF JULY ON THE WHITE MOUNTAINS

There will be a solemn congregation upon TRINITY HEIGHT, or Summit of Mount Washington, on the Fourth Day of July, A.D. 1851, and 1st year of the Theocracy, or Jewish Christianity, to dedicate to the coming of the Ancient of Days, in the glory of His Kingdom, and to the marriage of the Lamb; and the literal organization in this generation of the Christian or purple and royal Democracy (let no man profane that name!), or the thousand thousands, and ten thousand times ten thousand of the people of the Saints of the most high God of every nation and Denomination into the greatness of God's kingdom and dominion under the whole heavens; and there will be a contribution for this purpose from all who are willing, in the beauty of holiness, from the dawn of that day.

JOHN COFFIN NAZRO
Israel of Jerusalem[6]

The appointed Fourth of July was ushered in by weather as dark and rainy as any perhaps that ever shrouded Mount Washington in wildly flying clouds. Nazro, meeting with strong opposition in toll-gathering, gave up his temple-building designs, and throwing away his gatekeys to the entrance of this mighty altar, went away, and for years was not heard of again.

Some years after the Summit and Tiptop Houses had been built, and while John H. Spaulding was manager, he was surprised one day when a weather-beaten little man registered as John Nazro, U.S.N. He speedily told Mr. Spaulding that he was there to collect rents from those who were trespassing upon his supposed right. He said that influential friends, fearing that he might meet with bodily violence, had persuaded him to leave the mountains, and had obtained for him an appointment as acting chaplain on a United States man-of-war, on which he had been voyaging around the world. Mr. Spaulding continued: "On being informed that we paid yearly rent, as agreed, to David Pingree of Salem, Mass., and that thereby he was bound to protect us in our hotel enterprise, he took Mr. Pingree's address, and the next morning bid us 'good-bye' forever."[7]

In 1851 the summit was barren of any shelter. Something had to be done to make the place safe and comfortable for the increasing number of tourists coming up the mountain from Crawford, Fabyan, and the Glen, and, in 1852, there was built the first Summit House. The builders were Joseph S. Hall, who had built the Crawford bridle path and who was to have so much to do with the carriage road, Lucius M. Rosebrook of Lancaster, possibly a son of Eleazer, and Nathan R. Perkins of Jefferson. It was built of heavy stones, blasted from the mountain top, and stood within a few feet of the highest point. The timber and boards were brought up from the Glen on the sides of pack horses. Two small sticks of timber made a load for a horse. These were suspended by a chain thrown over a rude pack saddle, one stick on each side of the horse. The upper end of each stick was fastened to an end of the chain, while the other end of the timber dragged on the ground. In like manner, three small boards on each side of the horse made a load.

The heavy front door was carried up the mountain from the Glen House by Mr. Rosebrook, tied to his back with ropes. He is said to have carried a jug of molasses in his hand for good measure. The carpenter who put in the doors and windows was William Lyman Rowell of Lancaster, grandfather of George R. Lane, for several years proprietor of the Ravine House at Randolph.

The house was opened on 28 July 1852. The plan was to furnish dinners to visitors to the mountain. The first day the party numbered fifty-three, twelve of whom stayed overnight. Next year, Nathaniel Noyes, a restaurant-keeper of Boston,[8] later a merchant in Whitman, Massachusetts, with a friend persuaded the owners to sell them a half interest. The house was then enlarged so that it measured sixty-four by twenty-four feet, with a gable roof to provide for a second story. All the lumber was dragged up the six-mile trail from the Glen by ponies. The supplies were carried up in baskets strapped on the backs of the ponies like panniers. This, of course, was before there was any carriage road.

The building was bound to the rocks by two-inch cables that ran over the roof and were cemented to the rocky top of the mountain on either side. In telling about this fifty years later, Mr. Noyes recalled:

> Coal which cost $7 a ton in Portland cost us $25 when we got it up the mountain. At the opening of the season we carried up all the supplies we could, laying in a good stock of smoked and salted meats.

. . . We used to average nearly 100 diners a day, and people from all parts of the country, and travelers from foreign lands as well, came up the mountain. There were many ladies among the visitors, but not many of them walked up. One noon there were representatives of 13 different nations at dinner.

I guess I was the first newspaper correspondent in the mountains. Maj. Worthington . . . proprietor of the Boston *Traveller*, . . . asked me to send him down weekly letters from the summit. I would send him down something every week . . . and always "puffed" the house all I could. . . .

What were our rates? . . . dinner was $1, and $2.50 for three meals and lodgings. At that time no hotel in the mountains then charged over $2.50, and that price was rather exceptional.[9]

As to whether one dollar was enough for the dinner, after everything has been lugged up the steep trail, Mr. Noyes admits that it was no five-course affair, but just good plain, wholesome food, "and if there had not been a profit at $1 per plate, we should have charged more."

During the summer of 1853, while Nathaniel Noyes was proprietor of the old stone Summit House, his most illustrious guest was the Honorable Jefferson Davis, then Secretary of War in the cabinet of President Franklin Pierce, and later to become President of the Southern Confederacy. Being in poor health, he had left New York City 8 August to spend a month in northern New England with his friend, Professor Alexander Dallas Bache, great-grandson of Benjamin Franklin, and superintendent of the United States Coast Survey. A few days later he passed through Danville, Maine, "with much improved health." On the twenty-third, the two friends continued their journey to the Crawford House, and rode up Mount Washington, spending the night on the summit. Next day they descended to the Glen House, completing a trip which Mr. Noyes asserted "is a very pleasant route to travel."

That same summer of 1853, Samuel Fitch Spaulding of Lancaster, with Abraham Bedell and Anson Stillings of Jefferson, built the Tip-top House, the only one of the ancient buildings still standing. The necessary land was leased from John Bellows of Exeter, New Hampshire, the first proprietor of the Glen House, who claimed title to the summit as one of the owners of Thompson and Meserve's Purchase.

With a large crew of workmen they started work early in the spring, and were ready for guests by the end of July. Work was slowed up by the fact that the men had to go two miles down the mountain to a

temporary camp for the night, and return to the summit before starting work in the morning.

Just as in the building of the Summit House, all timber and boards had to be hauled up by horses. The timber was sawed out at a mill in Jefferson and brought by horses along the south branch of Israel River and through the woods of Jefferson Notch, up the Waumbek trail, crossing the lower part of Burt Ravine, and connecting with the Fabyan Path at Waumbek Junction, near the present Waumbek Tank on the railway. Thence it was hauled up over Jacob's Ladder and on to the summit, a total distance of nine miles.

The rock was blasted out and the walls built about as they are today. The house measured twenty-four by eighty-four feet, and had a deck roof form which visitors might secure an unobstructed view, aided on cloudless days by a telescope. John H. Spaulding, a relative of the builder, became manager of the new hotel. E. C. Spaulding of Marble Rock, Iowa, son of Samuel, revisiting the mountain after fifty years, admitted that the old Tiptop House was not very comfortable, and that most of the guests came for dinner, but returned below for the night. Three girls and four men did the housework.

A visitor to the mountains in 1878 recalled the summer of 1853 when the Tiptop House was being built. Said he:

> It was twenty-five years ago when I first walked over the Mount Pleasant foot-path, as it was then called, from the White Mountain Notch to the top of this mountain. It was a beautiful day in autumn, and as we followed the path higher and higher through the wood surrounded by the gorgeous autumn foliage, we boys, four of us, were full of enjoyment. When we neared the limit of vegetation, but a few rods in front of us we saw a large black bear with his paws upon a log, directly in our path, coolly surveying us. We were not as quick as he, and he soon gave us the road. . . .
>
> It was then believed that no person could stand the "rarefied air" of the summit unless he indulged in frequent libations. The Tip-Top House, with its flat roof, was hardly complete, but as you stepped in just beside the outside door stood the affable bartender, backed by various decanters, from which he dispensed at once to all new comers the health-giving elixir that was considered more necessary than food even. Of course it was in those days hard work to bring up the supplies of food, and many brought their own, buying some tea flavored with goat's milk (the goats living upon the mountain grass at the Summit) to aid its digestion. The Tip-Top House was finished inside, and partitioned with cotton cloth. The bedsteads were berths above each other, as in a steamer, made of fir poles brought up on horseback. The beds were filled with moss.[10]



Top of Mount Washington, 1854–56: Tiptop House, Estes tower, and Summit House with group of saddle horses.



The first Summit House, 1852.



Painting by Winslow Homer, *The Bridle Path, White Mountains*, near the summit of Mount Washington in the 1860s.



Tiptop House in 1863 after addition of peaked roof.

This article has particular interest in that it appears to be the only existing first-hand description of the interior of the Tiptop House in its first year. It has given us, also, the only reference to the "affable bartender" and the goats, as well as preserving the otherwise unrecorded name "Mount Pleasant foot-path" for the Crawford trail.

The next year the Summit House owners sold out to the Spauldings, who conducted the two hotels as one for nine years. Bedell had withdrawn from the enterprise before the house was finished, and Samuel Spaulding disposed of his interest in 1856.

John H. Spaulding's name is preserved in Spaulding Lake, that rocky little mountain lakelet at the foot of the headwall of the Great Gulf. By its side, overtaken by darkness, he once spent a cold and cheerless night. Spaulding is also remembered for his little volume, *Historical Relics of the White Mountains*, which contains many an interesting bit of mountain lore.

For one year previous to 1860, while the carriage road project lay dormant, Charles H. V. Cavis was manager of the two houses, his wife having charge of the feeding of guests. During that summer Mr. Cavis kept cows in a corral in what has since been called the Cow Pasture, near the seven-mile mark on the road. No record was kept of the supply of milk on the summit that season. It is presumed that the animals were glad to retire to the warmer meadows of the lowlands that fall, for they never again climbed the mountain.

Recounting the difficulties of hotel keeping on the bleak summit, Mrs. Cavis, many years later, said that to get an idea of how many guests to expect for dinner, she would go to the edge of the summit plateau and count the horses as they came in sight on the Crawford Path near the Lakes of the Clouds.

During the summer of 1861, David Nelson Cushman, formerly of Auburn, Maine, and his wife, ran the stone hotels.

In 1862 Colonel John R. Hitchcock, proprietor of the Alpine House in Gorham, took over the mountain houses, and conducted them until 1872. He added a pitched-roof story to the Tiptop House in which seventeen little bedrooms were provided.

It was during this period that President Franklin Pierce, a native of New Hampshire, made his only recorded visit to the summit of Mount Washington.

During these years, when business was booming on the summit, hotel business at the west of the mountain was increasing at such a rate that as early as 1852 Tom Crawford had found his original Notch

House inadequate, and had begun to build a large, modern hotel on the site of the present Crawford House. The financial burden proved too heavy for him, and soon he was forced to sell not only the new enterprise but also the old Notch House to a company headed by Major Joseph L. Gibb. In his later years Thomas was landlord of the American House at Lancaster, New Hampshire, where he died on 22 April 1865.

Major Gibb, who had been previously with his father, the proprietor of the Lafayette House in Franconia Notch, pushed the Crawford House to completion.

On 19 April 1853 Fabyan's Mount Washington House burned, ruining Horace Fabyan financially, and leaving Gibb without a competitor. He at once enlarged the Crawford House and improved the Notch House. Unfortunately, the latter burned in 1854, and the Crawford House was destroyed by fire on 30 April 1859. Under Major Gibb, things moved fast, and in sixty days the Crawford House was rebuilt, and served dinner to a hundred guests on the Fourth of July.

A glance at the old registers of the Crawford House reveals many names prominent in American public life. In 1856, Henry Ward Beecher,[11] an annual visitor to the White Mountains, was a guest. In September 1865 were registered Mr. and Mrs. John D. Rockefeller of Cleveland, celebrating the first anniversary of their wedding. In 1865 came Sylvester Marsh, who was then preparing to build the Mount Washington Cog Railway the following year. Another visitor of national fame was registered on 27 June 1870, in the person of Junius Henri Browne, correspondent of the New York *Herald* during the Civil War, who was captured and spent many months in Confederate prisons.

Major Gibb ran the Crawford House for several years, merging his interest finally in Gibb, Hartshorn & Co., which later became Hartshorn, Wolcott & Co.

On 7 December 1858 Samuel Fitch Spaulding, one of the proprietors of the Tiptop House, found it necessary to make an attachment on the property at the summit in connection with litigation as to its title. It fell to his son-in-law, Lucius Hartshorn, a deputy sheriff of Lancaster, to make the attachment. Accompanied by Ben Osgood of the Glen House, Hartshorn followed the carriage road to the Halfway House and then cut across the crust to the top.

Their troubles began when the two men attempted to enter one of the stone houses. Covered with hard-packed snow and ice, with frost

a foot and a half thick on the windows, the house proved to be very nearly burglar-proof. Finally they forced their way in through a window, finding the interior of the hotel like a tomb, the walls and all the furniture draped with some four inches of frost, while the air was extremely biting and the darkness such that a lamp was necessary to enable them to distinguish objects.

Delay was dangerous. Completing their legal duty, they stepped out on the platform to find a large and swiftly-moving cloud coming towards them from the southwest. To be caught in a frost cloud probably would prove fatal. With all possible speed they hurried down the mountain, managing to reach some shelter before they were enveloped in the icy cloud.[12]

Another winter ascent, on 19 February 1862, is worth recording. This was accomplished by John H. Spaulding of Lancaster, with two others, who spent two days and nights in the old Summit House.

Mr. Spaulding's own graphic account of his visit states that they left the Glen House at eight o'clock in the evening of 10 February, in bright moonlight, with ample packs and provisions. They used snowshoes on the first half of the trip, walking slowly up the carriage road in the still night, and reaching a point above the present Halfway House after midnight.

He describes vividly the beautiful scene—the glittering crust, the tree shadows across their path, and the white, winding road and contrasting evergreen thickets. Building a big fire, they dozed about it until daybreak, when they went on without snowshoes, advancing by cutting steps in the ice. At five miles up, a wide ice field was encountered, necessitating the cutting of deep steps. At about six miles a deep drift impeded their progress and prevented them from following the road. Here lunch was taken, and they found the thermometer registered, in a rising wind, twenty-seven degrees above zero. Storm clouds over toward Mt. Carter warned them to hasten on, which they did as rapidly as conditions would permit. Near the top a heavy black cloud settled down and froze upon them.

At the summit they found the houses covered with glistening ice and with curious frost feathers standing out on the northerly side. Climbing a drift, they broke away the ice from a south gable-end window of the old stone Summit House and managed to enter the attic. Bringing up a stove from the lower floor, they lighted a fire and passed a fairly comfortable night by barricading the walls and windows with mattresses.

In the morning they found themselves in the midst of a fierce blizzard, and were compelled to stand a siege for thirty-six hours. Within the hotel arctic conditions prevailed. Snow and ice lay piled all about from three inches to five feet deep. The furniture was set in feathery white casings, and snow wreaths and icicles were everywhere on the ceilings and walls. Mr. Spaulding describes the sun setting in a vast snow bank, and a hundred glittering peaks shining out like so many points of fire in the moonlight. The party returned to the Glen in another heavy snowstorm.[13]

6. The Carriage Road

ON 1 July 1853 the Governor of New Hampshire signed a bill granting to General David O. Macomber a charter for the Mount Washington Road Company, with a capital of $50,000. He planned to build a road sixteen feet wide, macadamized, with a protecting wall three feet high in dangerous places, leading to a palatial hotel at the summit of the mountain.

On 1 September, in the parlor of the Alpine House in Gorham, the company was organized, with Macomber as president and J. R. Lufkin, Portland, Maine, clerk and treasurer. Two directors, Abner Lowell and Robert I. Robinson, with William Senter, all three from Portland, undertook the raising of the money. The stock was issued to them in blocks of from one to twenty shares for convenience in transferring.

Once the charter was granted, Macomber was eager to get the road surveyed. On the second of July, through a Portland jeweler, Macomber met R. C. Ricker, a young civil engineer from St. Louis, who was hired to make the survey and to select the most picturesque route. The next day Ricker began his work, with Charles H. V. Cavis, an engineer from Concord, New Hampshire, as his assistant. The following year, on the death of Mr. Lufkin, Cavis succeeded him as clerk and treasurer of the company.

By the fall of 1854, Ricker and Cavis had completed the survey, locating the road almost exactly where it is today, eight miles long, with an average grade of twelve per cent, and a maximum grade of twenty-six per cent. They determined the height of the mountain to be 6284 feet, a figure which the government surveyors have inscribed on the marker at the summit. The contract for construction, at $8000 a mile, was awarded to John P. Rich and Dillon P. Myers, and Cavis was engaged as superintendent. Work was begun in 1855.

The task that lay ahead was enormous. Since the site was eight miles from the nearest railroad, all supplies and material had to be hauled to the base by horses and oxen. Dynamite was unknown. Black powder was the only explosive available. All holes for blasting were hand-drilled. Supplies of all kinds were carried up on the backs of horses or men.

In June 1855 Spaulding wrote: "When a carriage can run to the top of Mount Washington, who can prophesy what a bright new era will dawn upon White Mountain life? . . . a survey is this season anticipated, by which the road will be located somewhere down the western side; thus completing a carriage-route that for novelty, and unparalleled wonder-exciting location, will not in the western world have an equal."[1]

Cavis completed the survey to the summit, and carried it down the southern peaks of the Presidential Range to the Crawford House. But the Civil War interfered with the carrying out of this latter project. A later proposal to run a toll road the entire length of the Presidential Range is still in existence, in blueprint.

A glimpse of General Macomber's vigorous and inspiring personality is given by Starr King in the story of his first visit to Tuckerman Ravine in July 1855, where his party lunched dangerously under the Snow Arch: "Mr. Thompson, of the Glen House, has opened a horse-path from . . . the new Mount Washington carriage-road, to . . . [Hermit Lake] at the foot of the ravine. A small party of gentlemen was invited by . . . [D. O. Macomber] to try this path on foot, and dine with him at the snow-bank in the rocky gulf . . . A more competent or inspiring leader of such an excursion than Mr. M. it would be impossible to find."[2]

A unique, though long-forgotten, project of Macomber's was the building of an elaborate hotel on the summit and the designing of an omnibus for use on the road. Of this novel idea Major Lewis Downing, Jr., president of the Abbot-Downing Company of Concord, New Hampshire, whose Concord coaches have been known on every frontier in the United States, wrote: "General Macomber came to our shops in 1855 . . . and wanted us to make him a small model of an omnibus from his description . . . We delivered it to him July 6, 1855."[3] Macomber finally ordered twelve of these vehicles, but before they were entirely finished the road company failed.

These omnibuses were made with a cane seat chair for each passenger beside each window, six on each side of the vehicle. The bodies

were arranged with screws, two on each end, so that they could be placed on a level, either in going up or down the mountain.

Previous to this Major Downing had made for Macomber a small passenger wagon for use on the carriage road as it was being built, "and this we always considered the first real wagon made for the purpose that ever went up the mountain."[4]

These omnibuses were equipped with powerful brakes to be applied to the wheels and to be operated by the feet of the driver. Along the floor of the carriage lay a strap which could be pulled by any passenger if necessary, and the horses instantly brought to a standstill. For these vehicles—the model, the light wagon, and a baggage wagon—the Downing Company insisted on being paid, though never with any success.

Of the actual construction of the road, Ben Osgood, famous Glen House guide, wrote: "The day I went to the Glen, July 22d, 1856, the first two miles were completed."[5]

Evidently the Halfway House, 3840 feet above the sea, had been built by that time. The first four miles, to the Ledge above the Halfway House, were completed in 1857. Then the money became exhausted. No new backers being found, the work stopped. This was a cruel blow to General Macomber, who left the mountains, never to return.

On 25 April 1857 the directors met at Portland, but adjourned for three weeks at a request received by letter from Mr. Macomber. On 16 May they met again, but as there was no word from him, this unusual vote was entered in the records of the company: "Voted, that J. M. Wood try and find where the President is."[6]

Competition between the Glen Bridle Path on the east side of the mountain and the Crawford and Fabyan paths on the west was keen. The Fabyan House had burned in 1853, but the proprietors of the Crawford House and Brabrook's White Mountain House on the west side of the range and Thompson's Glen House on the east were doing their utmost to secure business for their strings of sure-footed ponies. Those on the west were highly pleased at the failure of the first Mount Washington Road Company, and pushed their plans to attract visitors to their side of the mountain. By 1857 they had opened a carriage road from the vicinity of Fabyan to a point well above the present Base Station of the cog railway. Over it passengers were carried in six-horse wagons to within two miles of the summit, whence the ascent was completed with well-trained ponies or on foot.

For three years the carriage road to the summit lay half completed.

But John P. Rich, one of the builders of the first four miles of the road, and Joseph S. Hall, leader in building the original Summit House, never lost faith in the enterprise. Through them David Pingree of Salem, Massachusetts, was led to enter the project as its financial backer.

No man in the White Mountains at that time was better equipped to finance the road or more interested in its success than Mr. Pingree. Since 1846 he had controlled a vast area of forest land in the tract known as Sargent's Purchase, lying southerly from Mount Washington. Also, through his interest in the Jackson Iron Manufacturing Company, which had extracted some ore from Iron Mountain in Jackson, he controlled woodland on and near Mount Washington, believed by the company to include the summit.

By 1859 Pingree's aid was assured, and with it that of his associate, Ebenezer S. Coe of Bangor, Maine. On 27 June a new corporation, to be called the Mount Washington Summit Road Company, was chartered, the directors of the old corporation surrendering to the contractors Rich and Myers their interest in the right of way and roadbed so far constructed and releasing to the state of New Hampshire their remaining interests. Thereupon the new company was organized, with Pingree, Rich, Nathaniel Weston of Salem, William Heywood of Lancaster, New Hampshire, William Senter of Portland, Maine, and Amos B. Merrill of Boston as directors. Pingree was elected president and Senter treasurer. Pingree and Rich each held 617 shares of stock. A qualifying share was issued to each of the other directors. On 6 July 1860 the directors voted to open the road from the Glen House to the Ledge, and begin collecting tolls.

Rich was appointed to superintend the construction to the summit, the contract for which was given to Joseph S. Hall. A date in the following summer was set for the work to be finished, and Hall put it through with a week or more to spare. He employed eighty workmen up to the day of the formal opening.

With the road almost completed, it is interesting to recall that Colonel Joseph M. Thompson, landlord of the first Glen House, and one of the ardent boosters of the carriage road in 1860, had, in 1853, opposed the road and had asked the Supreme Court of New Hampshire to forbid its construction. He claimed that the Legislature had no power to create a toll road to be used only for pleasure; and, if this contention was not sustained, he asked damages for loss of rental of the forty or fifty saddle horses he kept busy on his bridle path. The



Humorist Josh Billings at his spring near Glen House.



SUMMIT OF MOUNT WASHINGTON.

Carriage road, buses, and Summit House as planned by General Macomber.



First carriage to reach the summit of Mount Washington.



First coach to reach the summit 8 August 1861.



Fabyan House coach sent to the summit by B. F. Keith for Biograph (motion) pictures that were shown in the U. S. and many foreign countries. Charles Ellery O'Hara driving.



Building the big Summit House.



Old Peppersass used in building Cog Railway.

local court, which passed on land damages, awarded him $3500. The Carriage Road Corporation promptly appealed to the Supreme Court. There Thompson's lawyers argued that the charter was unconstitutional: "This isn't a public way. It is just a scheme for private emolument. The public good does not require that a road should be made over the highest mountain on this side of the continent."

The court disposed of this theory in a few words: "The particular object of travelers who might have occasion to use the road, whether business or health, or amusement and recreation, could not affect the question whether it was for the use of the public." And as for compensation for injury to his saddle-horse business, the court added: "Every man when he embarks in any business . . . must do it at the risk of such changes as time and the progress of the age may introduce."

Long before the road was opened, Mr. Thompson changed his attitude. He began to see the greatly increased business that the road would bring him in comparison to his bridle path, and he became an enthusiastic booster, so much so that during the spring of 1861, when the road was almost ready to be opened, keen rivalry sprang up between him and his neighbor, Colonel John R. Hitchcock, landlord of the Alpine House at Gorham, as to which of them should have the honor of driving the first vehicle to the summit. Thompson settled the question by driving a one-horse buckboard to the top in June, with two men holding the carriage upright on the rocks where the road was not finished. Ben Osgood, writing to my father in 1899, said: "J. M. Thompson and a man with him were the first to go to the top of the Mt. with any kind of a four wheeled carriage, having to go one half mile over the bridle path from the end of the road where the workmen were grading, and it was a grand triumph as they got up to the top and back without a scratch or break."[7]

With the opening of the road, Thompson's stable found plenty of new business in carrying mountain-wagon loads of tourists up the mountain. The wagons were three-seaters with four horses and four-seaters with six, carrying respectively seven and eleven passengers and driver.

Thursday, 8 August 1861, was the day of the official opening. Most of the directors except Mr. Pingree, with invited guests, came the day before from Portland to Gorham, and started for the summit at seven in the morning in three covered wagons designed by Colonel Hitchcock for mountain use. Parties from the Glen were already on the way. Writing to *Among the Clouds* in 1887, Joseph Hall stated that the

vehicle which received the credit for first reaching the summit was the eight-horse Concord coach driven by George W. Lane, afterwards for many years in charge of the stables of the Fabyan House until his retirement in 1898, but Mr. and Mrs. Hall actually led the way in a carriage "drawn by four beautiful buckskins, driven by Alonzo Newell." They had invited Mr. and Mrs. Thompson to ride with them, but they chose the hotel coach. Mr. Hall added:

> We were followed by Lane, with his eight-in-hand, who had as many passengers as could hang onto the coach. Mr. Thompson was sometimes on the inside by Mrs. Thompson and sometimes was standing on top of the coach waving an American flag.
>
> The excitement ran high and carriage after carriage followed. It was estimated that fully 200 people congregated on the Summit that day. I had brought up a six-pound cannon and a national salute was fired, but there was no responsive echo, until the cannon was taken a mile down the road, when Mount Washington answered back in echo notes.[8]

Soon after the Glen vehicles, came the three official mountain wagons. Abraham Bedell of Jefferson drove the first of the three, and both he and Lane received souvenir whips, suitably inscribed.

Escorting the official carriages to the summit on horseback was a young volunteer "marshal," Hamilton Willis of Boston, a cousin of Louisa May Alcott. At the angle of the road near the fifth milepost he proudly showed the visitors a big sofa-shaped rock which the workmen, for a bribe of ten pounds of tobacco, had set up and christened "Willis' Seat."

Describing the event years later, Mr. Lane wrote: "On August 8, 1861, I drove the first passenger to the summit of Mt. Washington with eight horses, and we had a beautiful day. There was no other coach driven up that day. Abraham Bedell drove a mountain wagon drawn by six horses, but didn't reach the summit until three hours after I did. I can't remember names of all my party—16 up—19 down the mountain . . . Rev. Dr. Adams of Old South Church, Boston, Mass. . . . was the man that presented me the whip. I have used it ever since then and still have it in my possession."[9]

In a dispatch from the summit, the *Eastern Argus* of Portland, Maine, added: "On arriving at the summit, the discharge of cannon proclaims our arrival and that the Simplon of the American Alps is opened."[10]

The Boston *Advertiser* reported that an English gentleman from Montreal proposed cheers of congratulation for the directors and

guests, followed by "three more as hearty for the Union of the States."[11]

After photographs were taken, there came a battalion of workmen, armed with axes, spades, and crowbars, led by the contractor, Mr. Hall, mounted and in a fantastic uniform—"the most picturesque part of which," writes the *Argus* reporter, "is his blue stockings drawn over his pants."[12]

The display of the flag and the firing of the salute were followed by an invitation for the guests to dine in the Tiptop House, then run by D. N. Cushman. Speeches by Mr. Rich, for the corporation, and by Hamilton Willis, J. S. Little, John A. Poor, and Robert I. Robison concluded the dinner.

Giving Mr. Hall a friendly send-off, the Boston *Advertiser* said: "Joseph S. Hall, the contractor . . . not only faithfully and fully carried forward to its successful completion, but is entitled to the eminent praise of having suggested the idea and plan of this noble work."[13] Thus was General Macomber officially relegated to the limbo of forgotten persons.

From that time on, the "mountain wagon" became a fixture with nearly every White Mountain hotel. The trip to Mount Washington in groups was a regular feature of a summer vacation. Landlords of many of the hotels became noted for their skill as drivers. Usually a drive to the mountain took a full day, including many miles uphill to the Glen, topped by four hours of steady walking for the horses up the toll road.

Of the few records of ascents of Mount Washington by the carriage road in its opening year, perhaps the most vivid and realistic was that of Louisa May Alcott. During that summer of 1861, Miss Alcott was vacationing at the Alpine House in Gorham, then run by "Jolly John Hitchcock." With her cousins Hamilton and Louisa Willis, she made the ascent in a mountain wagon drawn by six buckskin-colored horses and driven by the famous driver, Abraham Bedell of Jefferson. She tells of climbing up a "smooth ladder" where "sometimes we looked up granite walls that seemed to shut out the sky, then into gorges that sink sheer down a mile or more, and turned the brain giddy with a glance."[14]

Miss Alcott tells of timber line: "The trees grew smaller and smaller as we went, and the last miniature wood had something pathetic in it, the tiny trees were so like large ones in shape and age, and though so stunted, had a desperate sort of hardihood in clinging to the scanty soil, as if bent on living though all the elements forbid."

Her party ascended the flat roof of the Tiptop House for a look

through the telescope, then came down again for dinner. After dinner she tells of "picturesque guides, with metal badges on their caps, wearing gay jackets, and making shrill calls to the files of horses they led."

In all the years of horses and automobiles, there has been recorded but one fatal accident on the Mount Washington Summit Road, as it is now officially known. On 12 July 1880, a mile and three-quarters below the Halfway House, a four-horse mountain wagon in which were descending a party of tourists from Michigan was overturned as a result of too-rapid driving by an intoxicated driver. Mrs. Ira Chichester of Allegan, Michigan, was killed, while her husband and several others were injured.[15] Freeman Lindsey, the driver, who had been drinking with other drivers at the summit before driving down the mountain, received a broken leg and concussion of the brain. He was unconscious until the next morning, never fully recovered, and died some years later at Lancaster. All the drivers who had been drinking were discharged that night, and settlements made with the injured passengers.

One reminder of the men responsible for building the road, is a tablet in memory of John P. Rich, set in a huge slanting ledge of rock at the right of the road just after it starts to ascend from the Glen. It bears the inscription:

In Memory of
JOHN P. RICH
Who died in Windsor, Cal.,
Nov. 15, 1863.
He was one of the original contractors and Superintendent of
the completion of this work,
which was opened Aug. 8, 1861.

For years the stages and buses paused at the tablet for the passengers to read the inscription. One woman, who had been much impressed by the epitaph, turned to the driver with the question: "Where was Mr. Rich buried?"

"Right behind that rock, ma'am," replied the driver.

After the opening day in 1861, no other Concord coach climbed Mount Washington until 20 July 1899. On that day N. J. Keating, press representative of Keith's Theatre in Boston, sent the eight-horse coach from the Fabyan House to the summit, where biograph pictures

were taken by a representative of the American Mutoscope and Biograph Company of New York. These early motion pictures of the coach ascending the mountain, the crowd at the summit, and the railroad train were exhibited in leading cities in the United States and Europe, and brought a great amount of publicity to Mount Washington. In writing of the event Mr. Keating says:

> The coach picture made the biggest hit of the lot. . . . In some respects it is considered the most remarkable motion picture ever made . . . and it is always certain to elicit applause wherever included in a biograph program. . . . The panoramic view of the Summit is quite clear, the various buildings standing out distinctly against the white cloud background, and many of the personages moving about on the platform being distinctly recognizable, among others the publisher of *Among the Clouds*.[16]

This coach was the first and only one of the tallyho variety ever to make the ascent. It was built by the Abbot-Downing Company for use at the Twin Mountain House, and was delivered 4 July 1870. Of it Major Downing wrote:

> It has now become an historic coach, as I do not think there is another coach in the world photographed on such a world-renowned mountain. It is hardly necessary to say that it was built by the Abbot-Downing Company, for in fact, no other firm but ourselves has ever made this particular type of coach, the first one being made in 1827, 72 years ago, on the same spot where I am now writing.[17]

As an investment the carriage road soon paid dividends. But David Pingree, the promoter, did not live to benefit from it. This property, together with his great timberlands in New Hampshire and Maine, passed to the trustees, Ebenezer S. Coe of Bangor, Maine, and one of David's sons. Later, a second son, David, Jr., succeeded his brother as a trustee and continued to operate the road and collect tolls until 24 May 1906, when the Pingree stock was sold to E. Libby & Sons of Gorham, New Hampshire.

This was only two years after the first "Climb to the Clouds" automobile race up the carriage road. Few persons sensed the coming tide of automobile traffic which would one day sweep horse-drawn vehicles off the mountain road forever. Even the Libby Company, farsighted as it was in purchasing the Glen property, saw no immediate demand for transportation up the old road. Two days after taking title, the company wrote to the editor of *Among the Clouds*: "We have not decided

as yet to run a regular line of stages on the mountain, but intend to have a larger livery at the Glen to accommodate the public."[18]

It was not many years, however, before increasing demand for the privilege of driving an automobile to the pinnacle of New England began to manifest itself. The Libby Company was quick to see its opportunity, and to prepare for the really big business that later developed. How well the road had been surveyed and built was evidenced by the ease with which it has now been widened and improved with crushed stone to meet the demands of the automobile, and the fact that the location of the road has never been altered materially for conventional vehicles. But during the fall of 1952 a relocation was made just above the Horn to make it possible for Army "weasels" to climb the windward and, therefore, relatively snowless side of Chandler Ridge. For the leeward slope at this point above the Horn is usually laden with a deep and very steep snowdrift, completely covering the road.

During these years, also, a fleet of automobile stages has taken the place of the ancient mountain wagons, and thousands of private cars also make the ascent each year.

During that first summer of the Libby ownership, one hundred horse-drawn vehicles used the carriage road. In 1930, four thousand automobiles made the trip to the summit. The day of the horse on the mountain had ended, and the old highway was rechristened the "Automobile Road."

7. A Railway to the Moon

RAILROADING in the United States was barely twenty-nine years old and the first railroad in New Hampshire, the Nashua & Lowell, was in its twentieth year when in June of 1858 Sylvester Marsh petitioned the New Hampshire Legislature for a charter for a railroad to the summit of Mount Washington.

Even so unique a petition as this received practically no recognition in the press of that day. Fortunately some years later Mr. Marsh dictated an "Outline" of his connection with the railway. From this it appears that the legislators thought he was crazy, but that if he chose to "fool away" his own money in such an enterprise, that was his business. So they granted him charters for railways to the summits of Mounts Washington and Lafayette. One story has come down through the years that an amendment was proposed to permit Marsh to continue his railroad to the moon.

But this clear-headed vigorous man of fifty-five, the successful originator of meat-packing, who was still in business in Chicago after thirty years of activity, was no idle dreamer. Born in Campton, New Hampshire, in 1803, Sylvester was a husky lad, who did his share of chores on the backwoods farm. But during the brief school sessions, he discovered an intense interest in books, especially those dealing with machinery and inventions. More thoughtful than his brothers and sisters, Sylvester was forever tinkering with the farm machines and dreaming bright dreams of the big land Outside.

When he was twenty-three, Marsh was running a provision stand in the newly-built Quincy Market in Boston. Then, moving west to Ashtabula, Ohio, he supplied meat to New York and Boston markets. By the end of 1833 he was located in the infant village of Chicago,

selling beef to its three hundred inhabitants and to the garrison of Fort Dearborn. His invention of meat-packing machinery brought him a fortune, which was swept away in the panic of the 1830s. So he started again, this time in the grain business, recouped his losses, and was able to retire from active business in 1855, at the age of fifty-two.

"When a man has made enough to live on he ought to stop work," was Mr. Marsh's firm belief. So, having reached this comfortable status, he closed out his business and turned eastward to enjoy a quiet life in Boston's suburb, Jamaica Plain.

But leisure brought on dyspepsia, and years later, being asked at a public hearing, "What led you to build the Mount Washington Railway?" he replied, "I built it for a pastime and to cure the dyspepsia more than anything else."[1]

Perhaps a truer picture of what spurred him into this project can be found in his own description of a climb up Mount Washington in August 1857 with the minister of the Eliot Church, Roxbury, Massachusetts. Overtaken by storm and night, the two men lost their way, finally stumbling onto the Tiptop House nearly exhausted. Marsh at once saw the need of an easier and safer way to ascend the mountain, especially with travel to the summit only then in its infancy, and set himself to devise such a way.

But a highly pertinent question that has never before been answered, or even asked in any history of Mount Washington is: Where did this inventor of meat-packing machinery get the idea of a mountain-climbing cog railway? I do not mean to detract in the slightest from Mr. Marsh's farsighted vision nor from his tremendous energy and drive in promoting that vision and putting through an almost impossible task. But there is something incongruous about a man who has retired from business at the age of fifty-two, suddenly conceiving and putting into effect an idea so radically different from anything on which he had previously worked, and about his securing a charter for so remarkable a railway within three years, although the first working model he mentions was not built until some seven years after the charter was granted!

As the promoter and builder of one of the world's most spectacular railways, Sylvester Marsh earned and will always keep a niche in Mount Washington's hall of fame ample enough for his sturdy frame. But evidence has now been brought to light indicating that it was from Herrick Aiken (1797–1866), inventive genius of Franklin, New Hampshire, that Mr. Marsh first secured the idea of the cog railway,



Peppersass pushing an open car at the summit.



Train on Jacob's Ladder, highest and windiest trestle on the road.



Base Station with Marshfield House at left.



Looking southeast from Mount Washington. In the center is Mount Doublehead, with Lake Sebago beyond and Mount Kearsarge at right. Nearly 100 miles distant is the faint line of the Atlantic Ocean.

and that it was in the end Herrick's son Walter who made the railway a financial success. In an article in *Among the Clouds* on 1 September 1877, Walter Aiken stated that about 1850 his father conceived the idea of ascending Mount Washington by means of a cog railroad. He built a model of a roadbed and track with the cog rail, and made two ascents of Mount Washington on horseback to determine the feasibility of the idea and of the route. However, upon consulting with prominent railroad men, he was dissuaded from the enterprise, as they thought the scheme was impracticable and that it would not warrant the outlay. "I now have the model in my possession at my office," Walter Aiken added.

Neither Herrick Aiken nor his son Walter took out a patent of any kind in relation to the cog railway. Even this mention of Herrick's model brought out no further comment, and it was fifty years later before the granddaughter and great-granddaughter of the elder Aiken confirmed Walter's account of his father's connection with Marsh's "invention."[2] They told also of Mr. Marsh's many visits to their home, where he discussed the model and the details of building the railroad. Herrick's youngest son added that the route selected by Marsh was one of those blazed earlier by Herrick Aiken.

Herrick Aiken in 1854 started the manufacture of latch needles for making hosiery. Franklin needles are still said to be the best in the world. In the same year he invented the first circular knitting machine, which could produce a seamless stocking in less than five minutes.

Walter seems to have worked with his father from the first on the knitting machines and on the manufacture of stockings. With only a small force of operators, his hosiery output amounted to over $200,000 a year, a tremendous business in the fifties. So the Aikens were quite capable of inventing a cog railway and of building steam engines, while Marsh, himself a successful inventor and promoter, furnished the driving force to make the project successful.

No mention has ever been made of an agreement of any kind between Marsh and the Aikens. Subsequent events seem to indicate that they were content to permit Sylvester Marsh to do all the terrific labor, including the investment of cash, in the building of the road, and then come in later when success was assured. At any rate, they made no effort to stop him.

On 25 June 1858, the bill granting Marsh's charter was passed and signed by the Governor. It gave the Mount Washington Railway Company the exclusive right to operate and collect tolls for twenty years,

the railway to be completed within five years. Extensions of time were granted later. To protect the owners of the carriage road, an amendment to the bill stated that the railway should not be located over the roadway of the Mount Washington Road Company, or upon the easterly or northeasterly side of the mountain, without the consent of that company.

Then followed for Marsh a period of experiment, interspersed with many discouragements. On 30 August 1858 he applied for a patent for "Locomotive Engines" to climb a cog railway, only to be refused. Four patents granted between 1839 and 1849 stood in his way. Marsh's problem was to devise an engine that would not only climb a cog rail, but that would descend a sharp grade safely. This problem he finally worked out, and on 10 September 1861 was granted a patent covering two simple devices for making the locomotives safe either in ascending or descending the mountain.

One was a method of applying the power to the rear axle through cog wheels, which greatly multiplied the power of the engine while permitting the use of a locomotive of comparatively light weight. The other was a "lever pawl," or ratchet, to engage with a toothed wheel during the ascent, and so prevent the engine's running away downhill in case of failure of the steam power. During the descent the ratchet was disengaged.

In addition to mechanical safety devices, the steam cylinder was so constructed that by shutting off steam and opening a contrivance with stopcocks the engine was eased down by means of the compressed air in the cylinder. The pistons were like those of an ordinary engine. The rate of speed up or down grade was limited to three miles an hour. The engine, on being properly started, would move down without attendance and could be regulated so as to move at a rate slower than three miles an hour.

The period of the Civil War was no time to launch such a railway project, but in 1864, when Marsh was again in Chicago and making new inventions of value in the provision business, he designed and patented an air brake for his locomotive.[3] He then wrote to John E. Lyon, president of the Boston, Concord & Montreal Railroad, outlining his Mount Washington project, but Lyon, as he afterwards told Marsh, thought the letter was from "some crazy man," and gave it no thought.

But the more people ridiculed Sylvester Marsh, the more determined he became to put through his unique undertaking. Finally, to

make converts, he invested $500 in a complete model engine and car[4] and some twenty feet of track on which he worked the steam engine at a grade equal to Mount Washington, eighteen hundred feet to the mile. "The engine weighed seventeen pounds," wrote Mr. Marsh, "and I could put fifty pounds weight on the car and run it up and down the track in my office in Boston as often as I pleased."[5] This helped to enlist investors, and subscriptions to the amount of $20,000 were finally pledged, largely by railroads operating in or leading to the White Mountains, and conditioned on the inventor's demonstrating that his device would work. Marsh subscribed $5000.

In 1865 the Mount Washington Steam Railway Company was organized, with Mr. Marsh as president and construction agent. During the following winter the first locomotive was built from Marsh's model by Campbell, Whittier & Co., Boston, under supervision of his son, John F. Marsh, a civil engineer, and at a total expense of only $2000. This was a crude affair, with neither pump nor tender, but it answered the purpose of testing the feasibility of the scheme. Afterwards a pump and tender were added, and it proved to be a good engine and was used on the road until entirely worn out.

Mr. Marsh and his son had already surveyed the steepest part of the mountain to ascertain its grade. The final survey, locating the railroad exactly where it is today, was made by a man with long experience in building country roads. Colonel Orville E. Freeman of Lancaster, son-in-law of Ethan Allen Crawford, was called in after a "city surveyor" had made a layout of cuts and fills and uniform grades which, on a mountainside strewn with large, jagged rocks, would have run up an impossible cost.

Nature had given Marsh an easy choice of route in the shape of the great ridge projecting toward the valley of the Ammonoosuc and adopted by the pathmakers Ethan Allen Crawford and Horace Fabyan. Nothing else in Marsh's task was easy. To make a clearing large enough for train sheds, railroad sidings, a station, a hotel, a boarding house, and many other buildings, he had now to attack the wilderness. For living quarters for his men, he had a log cabin "rolled up" at the site of the Marshfield station of today. Every bit of material, equipment, and supplies had to be hauled by ox team from Littleton, the nearest railroad station, twenty-five miles distant. The men camped out in the woods until the log cabin was put up. Marsh wrote: "I drove the oxen in, in single file, with the yokes upon the men's backs, to draw the logs for the cabin."

Soon the men were felling trees and widening and making suitable for ox teams Horace Fabyan's road to the base of the mountain. Then came the job of hewing the logs into timbers, on which the rails were to be laid. Because of the peculiar structure of the railway, two continuous wooden supports were required for the rails carrying the weight of the engine and car and a third support for the cog rail. For this purpose no sawed timber was then available.

The first locomotive, shipped from Boston to Littleton in sections, was hauled twenty-five miles by ox teams to the base, and the parts assembled in an extemporized blacksmith shop. Hauling material over the rough road (at least seven miles of it corduroy) was a matter of great difficulty. At one time a piece of the engine slipped from an ox cart and pinned one of the men under its great weight. Hours passed before the machine could be lifted and the man freed. It is recorded that he was a "very sturdy" man and that he lived through the ordeal.

That first locomotive was christened "Hero," but the name never stuck. A visitor, having his first look at the strange object, was reminded by its upright boiler of the cruets then used as containers of certain table sauces and condiments, and cried, "There's your peppersass!" and "Old Peppersass" it was forever after.

Construction was pushed during the summer of 1866, and a quarter of a mile of track built, including a trestle bridge crossing the Ammonoosuc River at a grade of 1700 feet to a mile. A platform car to carry forty persons was built and "Peppersass" was made ready for its first practical test.

On 28 August a newspaper correspondent wrote: "The stockholders and parties in interest of the Mount Washington Steam Railway Company are to assemble to-morrow in the Notch of the White Mountains, near the old Fabyan stand, to witness a trial trip on the first and lower section of this remarkable work."[6]

Next day the public demonstration was held, attended by many railroad officials and men prominent in engineering. Everything went without a hitch, one reporter commenting: "The engine works to a charm, taking its load of forty passengers up a grade of fifteen degrees with the utmost ease."[7]

Following the demonstration the participants adjourned to the White Mountain House for dinner. The enthusiasm of the guests was voiced in a flood of oratory and unanimously expressed in resolutions praising the skill and ingenuity of Sylvester Marsh.

In a telegram to the Boston *Journal*, a reporter said: "I stopped the train myself on descending with one thumb and finger, with no more

effort than if I had been taking a pinch of snuff. . . . There was great enthusiasm and great rejoicing at the results."[3]

These newspaper reports were sent direct from the Base Station over the wires of the American Telegraph Company, whose director, Colonel J. W. Robinson, "cut in" on the wire which in 1864 he had strung over Mount Washington from Fabyan, with offices in the Tip-top House and the Glen House.

No longer was there any question of the building of the railway. "Up to this time," writes Mr. Marsh, "I had advanced the money to pay expenses out of my own private funds. We next called in an assessment of fifty cents on the stock [probably meaning fifty per cent], and I proceeded to build the road with such conveniences as I had at hand."

The officials of the railroads pledging support to the enterprise now assumed control and appointed as manager of construction Job J. Sanborn, a veteran employee of the Boston, Concord & Montreal Railroad, who continued for several years in charge of the mechanical department. "He built the remainder of the road [to quote Mr. Marsh's manuscript] following out almost precisely the same principles and methods I had employed, without making any improvements." Marsh, however, then residing at Littleton, kept closely in touch with the work and at times would "commute" day after day by two-horse team between his home and the base, starting before dawn and returning late at night, a round trip of fifty miles.

In the section of track built in 1866 Marsh made an improvement of the cog rail not only over the simple toothed rail described in his patent of 1861 but over all prior cog railways. The new rail, used without change to the present day, consisted of two strips of angle iron about six inches apart, bolted to the center stringer and connected every few inches by heavy round wrought-iron bolts, into which played the teeth of the cog wheels of the engine and the car. This rail was much more substantial than the toothed rail first planned and was much less liable to clog with frost or snow.

In 1867 about half a mile of track was laid. Early in 1868 the great trestle called Jacob's Ladder was built. On 14 August, with the track reaching within three-quarters of a mile of the summit, fifty invited guests rode up in a new passenger car, propelled by a new locomotive, the "George Stephenson," which, with Peppersass, made it possible to run two trains at a time. The visitors finished the ascent on foot, and dined at the Tiptop House.

Some time in '67, Marsh erected a sawmill at the Base, so that the

timbers and crossties for the railway could be turned out more easily than by hand.

Every effort was made in the fall of 1868 to finish the railway before winter, but when only a few hundred feet remained to be built, a furious snowstorm brought the work to a stop. An early resumption of building the following spring brought the line to completion in time for the first train to reach the summit on 3 July 1869. On 4 July the following telegram was sent from Concord to a Boston newspaper:

ASSISTANT SUPERINTENDENT ROWELL TELEGRAPHS THAT THE MT. WASHINGTON RAILWAY WAS COMPLETED YESTERDAY AND THAT TRAINS NOW RUN TO THE TIP-TOP HOUSE.

Strangely enough, in the original list of stockholders of the Mount Washington Railway there is no mention of Mr. Marsh. There is no written evidence that he ever received anything in return for the $5000 which he subscribed, and for the considerable amounts of money and personal effort he invested in the building of the road and its rolling stock. Apparently he never received the $10,000 "in stock or its equivalent in money for Patents charter & right of way as soon as enough of the Road was done to test its feasibility," as stated in his "Outline."

Marsh is listed as the president, with John E. Lyon as treasurer. One of the directors and the third largest stockholder was Walter Aiken. Just prior to the building of the George Stephenson, Mr. Lyon became the controlling factor in the company, and placed the contract for the Stephenson with Mr. Aiken's company. Nothing has hitherto been printed to indicate that during the building of this unique railway any rift developed in the management, and that Mr. Lyon aligned himself with Walter Aiken against Sylvester Marsh, the man whose enterprise, energy, money, and inventive genius had made the railway something more than a dream. Mr. Marsh's Outline, however, makes it quite evident that Mr. Lyon, in appointing Job Sanborn as manager of construction, had shorn Marsh of all but nominal authority. Added to this annoyance was the fact that Lyon placed the contract for the George Stephenson with Walter Aiken without consulting Marsh. The contract called for "an engine capable of carrying 6 tons freight or passengers up the Mt grade at a speed of 3 miles per hour." Marsh's comment was: "The engine never quite came up to the conditions of the contract, but the Co. accepted & payed [*sic*]

for it. He has since that time built 3 other engines," none of which was the equal of Old Peppersass, but cost a lot more. "I think he took stock for all his machines," continued Marsh. "He now holds 185 shares."

Herrick Aiken died soon after the Civil War, leaving his son to cash in on the Mount Washington enterprise. As Sylvester Marsh lost authority, Walter Aiken gained control of the railway. With the death of Mr. Keyes, president of the Passumpsic Railroad, Marsh appears to have lost his last backer among the directors of the Mount Washington Railway. He continued as president, and went through the formality of annual meetings, fearing that it would injure the road if the public knew he was dissatisfied or had withdrawn from its management. After putting in twelve years almost exclusively with the railroad, he wrote: "In the meantime I have shrunk in property more than $30,000, providing I get nothing out of my Mt. enterprize."[9]

But, however much he may have suffered financially, Sylvester Marsh will always be remembered as one of those men of vision who helped to make his era one of the truly dynamic periods of American life. He is still remembered in Marshfield, the little hamlet about the Base Station, which couples his name with that of Darby Field, the first white man ever to climb Mount Washington.

Marsh's fame as a mountain railway builder was quick to cross the Atlantic. In 1869 he was visited by two Swiss engineers who were working on plans for the railway up Mount Rigi. Marsh was invited to superintend the building of that railway, but declined. An interesting comparison of the two roads is the fact that the Rigi railroad has a maximum grade of 25 per cent, while the average on Mount Washington's tracks is 25 per cent, the steepest being 37.41 per cent, or a rise of 1980 feet to the mile. This grade is on Jacob's Ladder, the highest trestle on the road and the windiest spot on the entire ascent.

General Ulysses S. Grant, the first President of the United States to visit Mount Washington during his term of office, arrived at the Crawford House on 26 August 1869, to make the ascent next day. He was accompanied by Mrs. Grant and their son Jesse. The morning of the twenty-seventh was clear and snappy, with a brisk northwest wind, promising a fine view. The President's party was to drive to Marshfield by way of Fabyan. Anxious to try on these roads his skill at horsemanship, for which he was so famous as a boy in Ohio and as a cadet at West Point, the General chose a lively span to draw the carriage which

seated only himself and his wife. He sped over the road to Fabyan and continued more slowly up the turnpike to Marshfield, keeping well ahead of the two coaches carrying the other invited guests.

At the railway station Mr. Marsh welcomed the President, who studied the mechanism of the locomotive with keen appreciation. The train comprised the new George Stephenson and a new car built that year. The trip up the mountain was thoroughly enjoyed by the President and his party.

A salute from a cannon welcomed the Presidential party to the summit, with cheers from some two hundred visitors gathered to meet the train. Greeted by Colonel J. R. Hitchcock, landlord of the Tiptop House, the party took dinner, and were photographed by S. F. Adams of New Bedford, Massachusetts.[10]

The second President to visit Mount Washington while in office, Rutherford Birchard Hayes, accompanied by Mrs. Hayes and two sons (Webb C. and R. B. Hayes, Jr.), Secretary of State William M. Evarts, Attorney General Charles Devens, and Postmaster General D. M. Key, escorted by Governor B. F. Prescott and other prominent New Hampshire men, made the ascent by the cog railway on Monday, 20 August 1877, the literal "high spot" of a ten-day journey.

This was to be Mr. Hayes' fifth ascent. He first climbed Mount Washington in 1834 as a boy of eleven, on a visit to a Vermont uncle. During his Harvard Law School course he made two ascents, in 1843 and 1844. His fourth visit was in 1860 when he and Mrs. Hayes made a long journey through Canada and New England.

On this visit in 1877, the President called at the Signal Station, the weather observatory then maintained by the Signal Service of the United States Army. The sergeant in charge handed Mr. Hayes this greeting, wired from the Chief Signal Officer in Washington, D. C.: "The Signal Service welcomes the President to the highest office (mountain) save one in the United States. From the Atlantic to the Pacific Coast all is well."

To this the President replied: "Mrs. Hayes joins in thanking you for the dispatch and also for the magnificent weather you are giving us."[11]

This visit came during the period when Walter Aiken had taken full control of the railway, and when his work was fully as colorful and interesting as had been that of Sylvester Marsh. The first official recognition of Walter Aiken's authority came on 24 May 1871, when the directors voted to appoint "John E. Lyon and Walter Aiken [to] be a

committee with full power and authority to run and manage all the business of the road the present season."[12] The same vote was repeated through 1877. In 1878 Walter Aiken was elected superintendent and manager at a salary of $600 a year. That fall he and another man became the committee to run the business. Walter continued as manager, the last official entry being in 1886, to which was appended the words, "with thanks for able management." He was then elected president, serving until his death in 1893 at Havre de Grace, Maryland.

An interesting sidelight on Mr. Aiken's management is found in the treasurer's reports of operating expense and income covering the years 1871 to 1885, inclusive. That first year receipts of $19,372 were offset by expenses of $20,742. However, that appears to have been the only year when a deficit occurred. The first dividend, $9 a share, was paid in 1877, when passenger revenue topped $25,000. Two years later the dividend was increased to $10 a share, and was pegged at that amount through 1885. The best year recorded for passenger revenue was 1882, when the total income was $33,749, with expense $15,163.

The title of superintendent was held by Aiken's father-in-law, Captain John W. Dodge of Hampton Falls, New Hampshire, for several years until his death, about 1875.

In addition to being superintendent, Captain Dodge also held the post of conductor. He was always ready to answer the many, and often unexpected, questions of the passengers. Early in the history of the road, an uneasy lady was questioning him as to the various provisions for safety. One by one he explained the devices—a friction brake here, a band brake there, a toothed wheel with a ratchet playing into it, an air brake, and so on.

"And what would happen if this one broke?" she would ask, as he named them one by one. On each, he reassured her, till he came to the very last brake.

"And if that breaks, where do we go?" she demanded.

"Madam," he replied solemnly, "I can't decide. That depends entirely upon how you have lived in this world."[13]

Walter Aiken was a striking figure. He was tall and vigorous, with reddish chin whiskers that gave him the look of the traditional "Uncle Sam." He was the one man who knew everything about the railway and its rolling stock. If anything went wrong, he was certain to be able to fix it.

One day at the summit a locomotive refused to start. The engineer

could not discover the trouble. So Mr. Aiken put on overalls and crawled underneath and soon put things to rights. As he emerged, covered with dust and oil, a woman visitor, mistaking him for an employee, said:

"Will you please get me a drink of water?"

Mr. Aiken cheerfully complied with the request, whereupon the lady offered him a small tip.

"Madam," said Mr. Aiken, "I've put a great deal of money and work into this railroad, and this is the first dividend I've ever got, and it's so small that I think I won't take it."

Perhaps it was the lure of the heights that has focused the attention of most writers upon the summit of Mount Washington. Marshfield, at the base of the railway, has always remained a dim and hazy picture, never emerging into clear focus as an actual place where many hardy men and women slept, ate, washed clothes, felled trees to make a clearing, and sawed the wood into convenient lengths to fuel the cavernous fireboxes of the puffing little engines. Perhaps none of the thousands of tourists who every summer visit the mountain realize that at the Base once stood one of the first tourist hotels in the White Mountains, its history covering the years from about 1871 to 1895. The Marshfield House was two and a half stories in height, facing the west and having a broad piazza which commanded the beautiful view over the uninterrupted forests to the smaller mountain ranges in the west and southwest. The first landlord was E. K. Cox. The house was used by stage drivers before the railroad was extended to the Base from Fabyan. There were three large barns connected with it, which on some days were completely filled with horses from the different hotels.

Regular stages were run from the Crawford, Fabyan, and Twin Mountain Houses to connect with the morning and evening trains, and quite frequently some from the White Mountain House and from Bethlehem. John Horne, for many years superintendent of the railway, used to say, "Some days I have seen so many teams near the old depot that we were bothered in getting out the engines and cars."[14]

In June 1870 my father, Frank H. Burt, then a boy of ten, accompanied his father, Henry M. Burt, on a tour of the White Mountains by stagecoach. He said that the little group of buildings at Marshfield looked like a frontier settlement far removed from civilization. He was thrilled to lunch in the first real log cabin he had ever seen, and described the depot as an ungainly, unclapboarded, three-story building

with a tiny waiting room for passengers and bedrooms for the railway men. This was burned in 1895.

When the Mount Washington Railway opened, its greatest handicap was its location in the dense woods, twenty-five miles from the nearest railroad station in Littleton, and a dozen miles from the nearest hotel, the only approach being over the turnpike from Fabyan, constructed in 1866.

So it was a matter of rejoicing to the cog railway management when in 1874 the Boston, Concord & Montreal Railroad was extended from Littleton to Fabyan, and when in August 1875 the Portland & Ogdensburg Railroad was completed through the Notch to Fabyan.

In 1876 the B. C. & M. extended its tracks to a new terminal at the Base Station, about a half mile below Marshfield, the cog railway then being built downward to connect with the new feeder-line. The ride from Fabyan to the Base was interesting and picturesque. The passengers rode in an open car, pushed by the engine, so that they enjoyed all the view with a minimum of dust and smoke.

In those days the Fabyan station was the liveliest spot in the mountains at train time. While competition was at its keenest between the cog railway and the Glen House stage line up the carriage road, the latter announced a "Grand Circle Tour," up the mountain by rail, down by stage to the Glen House and out through Jackson to Glen Station, and return to Fabyan by the up-train through the Notch late in the afternoon.

One day the railway representative, an old Vermonter named Dave Cutting, had almost persuaded a party to take the railway trip to the summit, but was finally told: "Well, we'd like to go up, but we think we won't do it this year. We'll try and come next summer."

"Well," responded Dave in his most solemn tone, "You can do jes' as you're a min' ter, but ef I was you I'd go up now; we're goin' to take the mountain down in the fall!"

They went up.

One stormy night, not more than two or three years after the cog railway began operation, Walter Aiken and his young brother-in-law Arthur W. Dodge (afterwards a physician practicing in Boston) lodged in the Tiptop House, and were disturbed by rain beating in upon them through the antique and dilapidated roof. Other guests had been as uncomfortable, but could do nothing about it. Walter Aiken was the one man who could do something about it. He emphatically declared that he would build a hotel there in which people could sleep in dry

beds. The outcome, realized in 1873–74, was the building of the Mount Washington Summit House, two and a half stories high, the largest hotel in this country on any mountain of such height. The dining room had a seating capacity of about 150. An ell was added the next year affording a total of nearly a hundred sleeping rooms. It took 250 freight trains (at one car to a train) to transport up the mountain the material for the Summit House. The cost was about $70,000, shared by Mr. Aiken and John E. Lyon, who acted for the Boston, Concord & Montreal Railroad. The hotel was leased to the cog railway, first at $12,000 for the season. This was reduced to $10,000 and later to $9000. The railway's location on the mountain top was not large enough for the hotel, and additional space was leased for a term of five years from Messrs. Pingree & Rich (later Coe & Pingree), holders of title to most of Mount Washington. Since they were owners also of the controlling interest in the stock of the Mount Washington Summit Road Company, this lease paved the way for bitter rivalry and litigation in later years.

With the coming of the new Summit House, the two stone houses were given over to lodgings for the hotel and railway help. In 1885 the old stone Summit House was torn down and a wooden dormitory for the hotel help was built on the site. The new Summit House was operated first by Captain Dodge. Upon his death his wife, Mrs. Harriet Dodge, assumed the lease and carried on the hotel with success for seven summers.

When Mrs. Dodge retired, the Summit House was managed in 1884 and 1885 by Charles G. Emmons. From 1886 for the remainder of its history it was leased to the Barron, Merrill & Barron Company, completing their chain of White Mountain hotels, and continued under their management until destroyed by the fire which swept the mountain top on the evening of 18 June 1908. During most of this period the hotel was conducted by Miss Mattie A. Clarke, who was long remembered by visitors to the summit as a gracious and efficient hostess.

As for the engines that had made the railroad famous, Peppersass served the Mount Washington Railway well until 1878, when it was retired as worn out, and engines with horizontal boilers took the places of Peppersass and Stephenson.

In 1893 Peppersass was sent to be exhibited with other antique locomotives at the World's Columbian Exposition in Chicago. Afterwards it was placed in the Field Museum of Natural History on the Fair Grounds, and kept there until 1904, when the engine exhibit was

moved to the Louisiana Purchase Exposition in St. Louis. Somehow Old Peppersass then went into the keeping of the Baltimore & Ohio Railroad at Baltimore, Maryland, and was lost to New Englanders for twenty-three years.

In 1928 Peppersass was brought out of retirement by the Baltimore & Ohio Railroad, to appear at the Fair of the Iron Horse at Halethorpe, Maryland.

About this time the Reverend Guy Roberts, pastor of the Methodist Episcopal Church in Whitefield, New Hampshire, took the initiative in finding Old Peppersass and in returning it to its mountain home.[15]

In the spring of 1929 President Daniel Willard of the Baltimore & Ohio Railroad—himself a former New Englander—returned Old Peppersass to the Boston & Maine. Taken to the railway's shops in Concord, the old locomotive was reconditioned and refurbished with gay old-time colors and decorations. Officials of the Boston & Maine mechanical department, on inspecting the locomotive, were astonished to find that the old vertical boiler, with its conical rivets headed by hand, easily met water and steam pressure tests. Only the replacement of a few minor parts was necessary to restore Old Peppersass to her original condition. She was pronounced not only a tribute to "Yankee genius" in design, but a lasting example of New England thoroughness in construction.

On 26 June the old engine was returned to the Base Station. "Jack" (E. C.) Frost of Concord, old-time engineer, was sent to get Peppersass into shape for another mountain climb. But something was the matter internally, and the old boiler wouldn't properly make steam. So Engineer Frost made an examination, and removed several quarts of nuts and cherry stones from the boiler of the old engine, carried in by squirrels years before. After that operation, Old Peppersass steamed as well as ever. One day Frost drove her to the top of Cold Spring Hill and back without damage.

This led the Reverend Mr. Roberts to suggest that the engine might be run once more to the summit of the mountain, and then left there in a little house of its own. But the railroad officials turned down this idea for fear hikers might carry away the old locomotive, piece by piece, as souvenirs. As an alternative it was decided to run her to the top of Jacob's Ladder; then coast back to the Base Station, to remain there as a permanent exhibit.

The idea of that last climb grew until it blossomed into a publicity stunt to be held on Saturday, 20 July 1929, when governors, hotel and

railroad men, and other persons of importance came together to pay their respects to a now-famous machine, and to top off the exercises with a ride up the cog railway. After a luncheon at the Mount Washington Hotel, the old Crawford coach—that years ago had carried thousands of passengers in to the Base Station—now drawn by six horses and driven by George Howland of Crawford's, carried to the Bretton Woods Station a group headed by Governor Charles W. Tobey of New Hampshire and President George Hannauer of the Boston & Maine Railroad. There special trains on the branch railroad were waiting to take a great party of guests to the exercises at the Base.

At the conclusion of the speeches, when Old Peppersass came chugging up the track from the engine house, blowing her whistle with great vigor, Mr. Hannauer, with a bottle of water secured by Colonel William A. Barron of the Crawford House from the Lakes of the Clouds, "christened" the old engine, dedicating her to the further development of the recreational interests of the White Mountains.

When the last of the six trainloads of guests had left for the summit, Old Peppersass started her last climb, in charge of engineer Jack Frost and fireman William I. Newsham, both of Concord, and accompanied by Lawrence Richardson, chief mechanical officer of the Boston & Maine Railroad, who went only part of the way.

Somewhere three unauthorized persons climbed aboard the ancient locomotive: Caleb Frost, son of the engineer, and two photographers, Winston H. Pote, then of Swampscott, Massachusetts, now living near Lancaster, and Daniel P. Rossiter of Ludlow, Vermont, who was recording the event pictorially for the state publicity bureau and the Boston & Maine Railroad.

Successfully climbing Jacob's Ladder, and reaching a point about half a mile from the summit, Jack Frost stopped the engine and decided to return to the Base. Starting down, Peppersass reached the vicinity of bent number 800,* one mile from the summit, when, as it appeared later, a tooth broke out of one of the gear wheels. This caused the engine to jump up at the upper, forward end, and when it dropped back the cog-wheel came down at the right hand side of the cog-rail and of course not in mesh with it.

Instantly the old engine began to gather great headway down the steep grade of Long Trestle, just above Jacob's Ladder. Frost and

*The cog railroad is built in twelve-foot sections, known as "bents." These are numbered from 1 at the foot to 1200 at the summit of the mountain.

Newsham at once applied the hand friction brake with all their combined strength but without checking in the slightest the wild plunging of Old Peppersass. As Engineer Frost shouted "Jump!" his son Caleb leaped to the rocks below without injury. Winston Pote, still grasping his camera and endeavoring to catch the final shot of the doomed engine, dived head first to the rocks. As he fell, he managed to deflect his head just enough to miss a jagged pointed boulder. He landed with a badly smashed jaw and enough injuries to keep him hospitalized for some time. Frost and Newsham jumped. Both suffered broken bones, but all three of the injured eventually recovered.

But Daniel Rossiter stuck to the engine for at least 1572 feet before dropping off, when he crashed to instant death on the jagged rocks at the foot of Jacob's Ladder. Old Peppersass continued her wild rush down over Jacob's Ladder, shrieking out her swan song and tearing her way down to destruction as she leaped from the track at the foot of the Ladder.

Eventually the various parts of Old Peppersass were salvaged from Burt Ravine and were reassembled and placed on exhibition at the Base Station.

Men of ability and resourcefulness were never lacking among the cog railway personnel. One of the longest records on the mountain was held by John Horne of Lakeport, New Hampshire, employed for thirty-seven summers, from 1874 to 1911, the last twelve as superintendent. A short wiry man with keen eyes, graying reddish hair and close-cropped whiskers, and a straight nose that accentuated the pointedness of his features, his actions were quick, though always purposeful. He would listen attentively, and then swiftly give the proper orders or do the right thing if any emergency threatened. He had a fund of humorous anecdotes about his beloved railway, and always enjoyed chatting or explaining mechanical details to anybody who was really interested.

Born at Keighley, West Riding of Yorkshire, England, on 18 February 1843, he retained enough of the broad Yorkshire accent to add spice to his conversation. John Horne came early to this country, and worked in the machine shops of the Boston & Maine Railroad at Lakeport when not engaged in cog railroading. He was familiar with every mechanical detail of the road. For several years he held the position of conductor, although his best work was done as superintendent. He died on 22 July 1927.

John had a personal affection for the queer little engines that powered the mountain-climbing trains. He knew how hard they worked, and he regarded them all as a physician regards his patients.

As to the power of these engines, let me give you an illustration. Take, for instance, a block of granite that, lying on the ground, weighs 18 tons. Now undertake to lift it to the top of a building 3700 feet high in 70 minutes. If you succeed it would be called a great feat. We do that practically every trip up the mountain.[16]

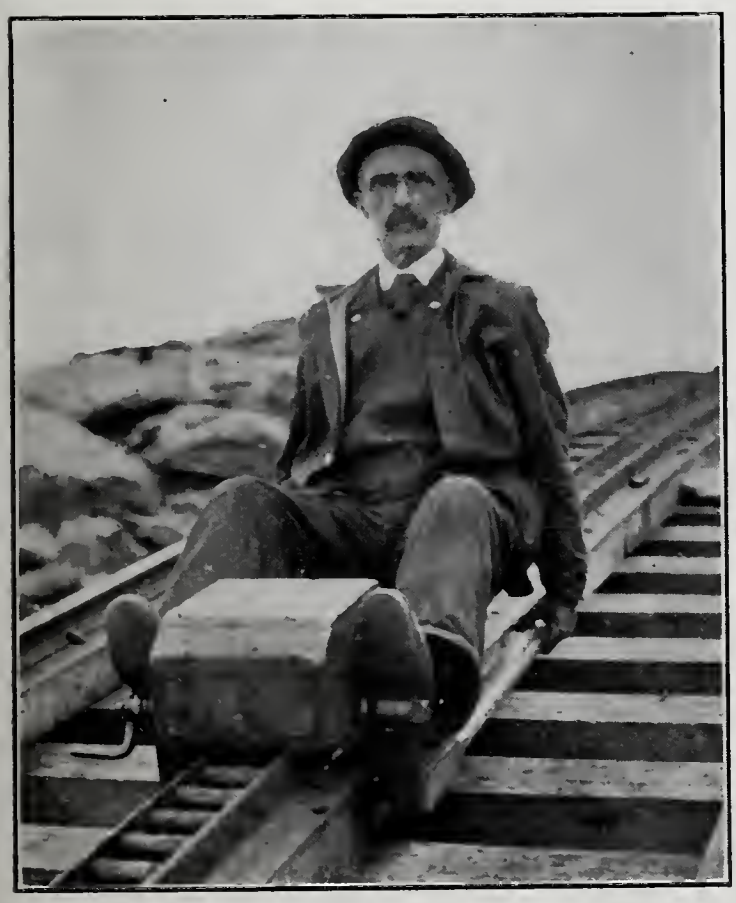
Accidents on this railway have been extremely rare, owing largely to the caliber of the men who operated it. At noon on 22 August 1878 four trains were carrying 260 passengers to the summit. The fourth train, pushed by Engine No. 5, "Cloud," was just starting up Long Trestle, above Jacob's Ladder, when, owing to a defect in manufacture, seven of the nineteen cogs in the rear driving wheel gave way. This brought the train to a standstill. The passengers were transferred to another train, and all four trainloads of visitors remained over night at the Summit House.

Of the five engines on the road, only old Stephenson, with its one driving axle, was below. Up came John Horne in the old engine, eased the tender of the disabled Cloud down to the Base, and went back for the engine itself. But going down Cold Spring Hill the cog wheel on the Stephenson split open. She jumped the rail, and then the driving gears got onto the ties and kept breaking them and carrying the debris along with it. As Mr. Horne told the story: "She choked herself and had timber ahead to stop her. On the low trestle the men all jumped but me. I saw it keep slacking up and slacking up, and by and by it stopped."

Clearing the wreck was quite a job. Everything had to be carried up. A man would start up with three or four bolts and would drop two on the way. It took three days to get things fixed up. They cut up the Stephenson and dumped it off the side of the track, taking out all the material that could be used. But, in the tradition of the road, no passengers were hurt.

The most picturesque, and hazardous, method of transportation on Mount Washington was by slideboard. About three feet long and a foot wide, and made of wood reinforced with metal, the slideboard fitted over the cog rail. Two friction-brake handles, one on either side, were equipped with pieces of metal which slid under the projecting side flanges of the cog rail. By pulling up on these handles, the speed of the slideboard could be checked. No one but workmen were ever

President U. S. Grant's party at Tiptop House 27 August 1869. Front center are Mrs. Grant, Pres. Grant, and son Jesse (top of head showing).



Roadmaster Patrick Camden on slideboard.



A "Big Day" on the summit. Observation tower at left rear.



The new Summit House, 1915, and Tiptop House.

permitted to use them, as it required both experience and strength to manage a slideboard safely.

These slideboards were born of necessity. They were used up to about 1930 by workmen to make the descent of the mountain at the close of each day's work, starting when the whistle at the Base Station blew five o'clock, and arriving almost before the echoes of the whistle had died away among the mountains. Ten minutes for three miles was a customary time. Two minutes and forty-five seconds was the record.

"How long does it take to go down on the slideboard?" asked an interested young lady.

"I can't tell exactly," replied John Horne, "but I stood at the door of the Summit House one day with my watch in one hand and the telephone in the other, and as the fellow let go the brake and started down I hollered in the phone, 'He's off!' and the operator at the Base called back, 'He's here!' "

Although two accounts exist of women traveling down by slideboard,[17] so far as is recorded no woman ever rode a slideboard alone, and few men besides railroad workmen ever had that opportunity. About 1930, because of several deaths over the years, slideboards were permanently banned.

Once, near-tragedy gave way to comedy, when a little Frenchman named Peter Goodroe came sailing down the track on his slideboard, approaching some road men at work. They had a crowbar stuck in the center cog-rail, inclining downhill and a little to one side. Thinking the men would pull out the crowbar, Peter continued his breakneck descent, ran up and off the end of the crowbar, sailing through the air some twenty feet, and landing unharmed, but very mad, in a clump of bushes.

One boyhood recollection still clings to the picture of the slideboard. I was standing in front of the Summit House when a voice behind me said: "Want to take a ride, son?" A minute later, too surprised to do more than gasp out a breathless "Yes," I was crouched at the bottom end of a slideboard between the feet of Pat Camden, the kindly, efficient man whose job as roadmaster was to keep the rails safe for the two trains a day. In another minute, my hair on end and the cold shivers running up and down my spine, we glided to a smooth stop at the Gulf Tank, a mile below the summit.

A never-fulfilled scheme for Mount Washington was laid out in the summers of 1910 to 1913, when, through the ambitious leadership

of President Mellen of the Boston & Maine Railroad, surveys were made for an electric railway up the mountain. This was to start at the present base, and rise by easy grades, circling the cone of Mount Washington some three times on its way to the summit. The $2,000,000 project also included the erection at the summit of a circular, three-story stone and steel hotel, with 100 sleeping rooms, and a dining room to seat 300 to 400 persons.[18] Opposition by various groups, as well as the embarrassed financial condition of the Boston and Maine, caused the plan to be dropped.

Some twenty years later Sir Harry Oakes, Canadian mining magnate, came to the mountains and talked with Colonel Henry Teague about a plan for building an electric railway and a magnificent hotel on the summit. The plan was getting into the blueprint stage but was abandoned when Sir Harry was murdered at his home in the Bahamas.

8. Changing Fashions in Hotels

TWO brothers from Portland, Maine, Weston F. and Charles R. Milliken, owners of the leading wholesale grocery business in that city, had become interested in the Glen House (the hotel started by John Bellows near Dolly Copp's home) through their business relations with Colonel Thompson when he was its owner. Charles, a graduate of Hebron Academy, in 1854 had started clerking for the wholesale grocery firm of Abner Shaw & Co. in Portland. Within a few years he was in partnership with his brother Weston, with whom he bought the Glen House from the Thompson heirs in 1870, including the stage lines to Mount Washington and the lines down through the notch to Glen station. Charles Milliken took personal charge of the property, developing it into the finest and largest hotel and stage business in the entire White Mountain region. He built a duplicate of the original four-story hotel and connected the two with a two-story building, the office and lobby in front and the enormous dining room in the rear, to bring the capacity of the hotel to 500 guests. The parlor, measuring 100 by 60 feet, filled the ground floor of the northerly section of the hotel. This room was so large that no carpet broad enough to cover the floor could be found. So a complete carpet mill was set to work turning out carpeting until enough had been woven for the 6000 square feet. This great hostelry was on a terrace above the Peabody River and on the highest part of the grounds adjoining the highway, now left vacant.

During the years when Mr. Milliken conducted the Glen House he entertained such distinguished visitors as President Grant, William H. Vanderbilt, Sir Henry Tyler, and scores of others.

On the October day in 1884 when the old Glen House closed for the

season, it caught fire and burned to the ground. Nothing was saved except the fine staging and livery equipment.

Next summer the Glen House was rebuilt, more beautiful and convenient than before. In 1886 another wing was built. But the development of hotels to the west of the mountains, combined with the distance from the railway, cast a shadow over the Glen. The business of the old days did not return. In 1893, soon after the opening of the season, the new Glen, as it was called, burned, and Mr. Milliken never rebuilt. He still operated the extensive farm. Later one of the great carriage houses was blown down, and much of the staging equipment was injured. This was finally auctioned off.

From that time the site lay vacant until after the death of Mr. Milliken on 16 August 1906, when it was sold, together with extensive forest tracts, to the E. Libby & Sons Company of Gorham.

With the burning of the second Glen House the era of fashion and gracious living in the Glen came to an end. The huge hotel, the hundreds of fashionably dressed guests, the immense dining room with its exquisite table appointments, the fine orchestra and the glamorous balls, the gay coaching parties, and the other trappings of society disappeared, never to return. The little Glen, nestled in the midst of the narrow Pinkham Notch with towering mountains on either hand, was a natural jumping-off place for climbing in summer and skiing in winter. The Libbys' small Glen House (two former ones have been burned and rebuilt) and the Pinkham Notch Camp of the Appalachian Mountain Club, which now occupy the Glen, are places to stop overnight before a climb or to spend a week end of skiing. They are usually crowded with happy, hungry young people in all sorts of odd costumes entirely appropriate to the place but in no way reminiscent of the glories of the seventies and eighties. These hostelries, along with the Tuckerman Ravine shelters, owned by the United States Forest Service and operated by the Appalachian Mountain Club, are centers of activity and fun as well as havens of refuge for many a tired or injured skier.

While the tide of fashion was receding from the old Glen House, there was a definitely rising tide of big hotel activity in the broad valley to the west of Mount Washington. Here there was plenty of room for building; acreage for golf courses, tennis courts, and baseball diamonds (the big hotels maintained baseball teams of college students as well as orchestras of symphony players for many years); and forest trails for horseback riding or for walking.

After the burning of Tom Crawford's Notch House and of Ethan Allen Crawford's old Moosehorn Tavern on the Giant's Grave, no hotel close to Mount Washington was left but the Crawford House, already one of the most fashionable hotels in the White Mountains. While the Crawford family's chain of hotels was on the wane, a new and greater chain of White Mountain hotels was in the making.

In 1868 Asa Taylor Barron, a native of Quechee, Vermont, who had formerly been in the hotel business at White River Junction, started his White Mountain venture by building the Twin Mountain House five miles west of Fabyan.

He quickly saw the possibilities latent in the Crawford House, especially what the coming of the railroad would mean to it in a few years. So in 1872 he and his brother Oscar F. Barron, under the firm name of A. T. & O. F. Barron, bought that already famous hotel from Hartshorn, Wolcott & Co. Asa's oldest son, Oscar G., became manager of the "Twin," and Cordeanio H. ("Dean") Merrill, a young man from Shelburne Falls, Massachusetts, was sent to the Crawford House as resident manager.

Two years later the Boston & Maine Railroad built the Fabyan House near the site of Ethan Crawford's original inn, and leased it to the Barron group for a long period. But first they spent two years carting away and leveling the Giant's Grave to produce a broad plain for hotel activities.

That year of 1874 was a great boon to White Mountain travel, for it was then that the railroad was built from Littleton to Fabyan, just ahead of the opening of the new hotel.

Next summer the railroad was completed through Crawford Notch to Fabyan, having come as far as Bartlett in 1873. This railroad trip up through the Notch was picturesque and exciting, especially when taken in the open observation car that was attached to the up-train at Bartlett. During the late eighties and the nineties the trip was made even more interesting by the booming voice of Conductor Richards—he of the shaggy eyebrows and great handle-bar mustache—sounding out the points of interest. "We are now passing over Frankenstein Trestle, the highest trestle on the road. At your left . . ."

Thus was provided through train service in both directions from Boston, and, via White River Junction and Littleton, day and sleeping-car service from New York. Soon the train yard at Fabyan began to be taxed to capacity by the crowded trains bringing hundreds of vacationists to this new center of social activity. The Twin Mountain, the

Fabyan, and the Crawford Houses now were filled with guests. It was a boom time for White Mountain hotels. New York, Philadelphia, and Boston society had put their seal of approval on the new summer resort. There was demand enough to make profitable another hotel in this area.

And in 1876, a half mile east of the Fabyan House, John T. G. Leavitt chose an ideal site for a hotel, high above the Ammonoosuc, commanding the best view that can be found on the western face of Mount Washington. Here he built the Mount Pleasant House. It was of simple design, three stories high. In 1881 it was sold to Oscar V. Pitman of Concord, New Hampshire, and to Joseph Stickney, a Wilkes-Barre, Pennsylvania, coal baron. A fourth story was added and a long addition made to the north end to provide a larger dining room. For several years it was leased to the Barron group and was managed for some time by Abbott L. Fabyan, son of Horace.

About 1885, on the death of Oscar F. Barron, a new partnership, Barron, Merrill & Barron Company, came into being. Partners with Asa were his son Oscar G. Barron and Dean Merrill. From 1886 till the sale of the Mount Washington railway in 1931, this new company leased and ran the Mount Washington Summit House. In 1887, Asa died, and a younger son, half-brother of Oscar G., William A. Barron (known throughout the mountains in years to come as Colonel "Billy" Barron), became the junior partner of what was fast becoming the best-known name in White Mountain hotel business. Under the new setup, Oscar became manager of the Fabyan House, and Billy took charge of the Twin.

Oscar G. Barron was a large man, with flowing side whiskers, a genial smile, booming voice, a hearty handclasp, and a keen sense of humor. In my early recollections of the Fabyan House there is always the portly figure of Oscar Barron standing in the doorway with hand extended to greet the guests coming from the railroad station a hundred feet in front of the hotel. His greeting was just as hearty and sincere whether you were about to take the most expensive suite in the house or were merely a newspaperman accepting his kindly invitation to "go right into the dining room; dinner is ready!"

As Mr. Merrill's health failed, and he retired and soon died, the operating company was closed out and the Barron Hotel Company took over the operation of the hotels in addition to the ownership of the real estate.

W. A. Barron now took charge of the Crawford House, where he

became one of the most popular and influential hotel proprietors in the White Mountains. His younger brother Harry B. ("Hal") Barron took charge of the Twin Mountain House, where he remained as long as the family owned the hotel.

In August 1892, when electricity was only barely coming into public use, a giant electric searchlight—the greatest ever conceived—was set in operation on the summit of Mount Washington. So powerful was it that a long shaft of light sweeping the night sky was seen from western Massachusetts to the Maine coast, and throughout northern New Hampshire.

The light was a thirty-six-inch, 200-ampere searchlight, the largest known at that time. It was designed by engineers of the Thomson-Houston Electric Company,[1] which that fall was merged with the General Electric Company. Archer W. Ives, the engineer in charge of this unique project, said that the purposes of the searchlight were to determine distances between which it was possible to signal from elevated points, and also to provide an added attraction to summer vacationists in the White Mountains. The light was placed on top of a tower fifty-five feet above the summit. The current was generated by a dynamo driven by a fifteen-horsepower steam engine in the bottom of the tower.

By using Morse code Mr. Ives could "talk" with the observation tower in Portland, ninety miles distant; and with Cape Ann, in Massachusetts, one hundred miles away. On clear nights they used colored slides on the searchlight to furnish "colored moonlight."

In 1895 the Mount Pleasant House came into the possession of Joseph Stickney. He remodeled the old house into a structure of architectural taste and beauty, and placed it under the management of Messrs. Anderson & Price, who for many years ran the Hotel Ormond at Ormond Beach, Florida. Mr. Anderson had known and loved the White Mountains from youth. In high school days in Portland, Maine, he was one of a group who made summer trips to the mountains. His father, Samuel J. Anderson, was the first president of the Portland & Ogdensburg Railroad Company, which under his leadership had built the railroad through Crawford Notch.

John Anderson's love of nature must have led him to a close study of the territory across the Ammonoosuc in front of the hotel. Within a few years after he came to the Mount Pleasant House, he discovered a site still more spectacular, not more than a mile away, and suited for

an even more spacious hotel. This was a long and lofty glacial ridge, similar to the ancient Giant's Grave at Fabyan, but winding so as to command views of Mount Washington and other peaks of that range as well as the mountains south of the Ammonoosuc. It was all part of the area Joseph Stickney had acquired in 1881 together with the Mount Pleasant House.

For a year or more the project was discussed. Then one evening in the summer of 1901, when my father was at the Mount Pleasant House, Mr. Anderson called him into his private office and showed him blueprints of a grand structure which Mr. Stickney's architects had visioned, to be known as the Mount Washington Hotel.

Next year saw the new hotel far advanced. Work was speeded, and its opening took place 28 July 1902. The opening ball and banquet at the magnificent hotel took place on the first of August. Among those attending were New Hampshire's Governor Chester B. Jordan, hotel men from many parts of New England, and John Wingate Weeks,[2] then mayor of Newton, Massachusetts, who was a native of Lancaster, New Hampshire, and a grandnephew and namesake of that Major Weeks who, in 1820, was largely responsible for naming the peaks of the Presidential Range. Mayor Weeks, while serving in Congress from 1905 to 1913, was father of the Weeks Bill which brought into being the White Mountain National Forest. Through its provisions the entire Presidential Range, with the exception of the summit of Mount Washington and the cog railway, became part of the National Forest. Also among the guests were two whose names were reminiscent of the pioneer days in that very locality—Ethan Allen Crawford III, and his daughter Lucy Howe Crawford, of Jefferson Highlands, New Hampshire, grandson and great-granddaughter and namesakes of the famous innkeepers on the Giant's Grave at Fabyan.

There is an interesting bit of coincidence and of history mixed up with the name Bretton Woods, where the hotel stands. When the site for the Mount Washington Hotel was chosen, the locality was nameless. It was just a part of the tract labeled on the official maps as Nash and Sawyer's Location, containing no village or post office. A part of the Jefferson Notch road had been under construction. On its opening Mr. Anderson was riding to take part in the official exercises with Ethan Allen Crawford III, one of the road builders. A thought flashed into Ethan's mind.

"Too bad they aren't going to call the new hotel the Bretton Woods!" he exclaimed.

"What does that mean?" queried John Anderson.

"It's the original name of the town of Carroll," Ethan Crawford told him.

"I could see Mr. Anderson's face drop," Mr. Crawford said later. The chance of giving the hotel the name adopted so many years before by the original grantees of that region had been lost.

What discussion John Anderson had with Mr. Joseph Stickney, who had lavished his wealth on the great hotel, is not known. But with the opening of the season of 1903 the newspapers carried the announcement that the post office, railroad station, and express office were all to bear the name Bretton Woods. The name proclaimed in the charter granted in 1772 by the royal governor was revived to endure. A year later (1904) the press throughout the nation carried the stories of the first automobile races on the Mount Washington Carriage Road, all bearing the dateline of Bretton Woods, the new hotel being the headquarters for the Glidden Tour which sponsored the races, and for the contestants and the newsmen.

One summer day, a few years before the building of the big hotel, Joseph Stickney sailed up Boston Harbor in his palatial yacht, the *Susquehanna*. The crew of twenty-five or thirty men worked only for his pleasure, for, with all his wealth, he had never had time to think of marriage. In Boston he telephoned to Colonel Barron's sister Josephine in Newburyport; asked her to make up a suitable party, and bring her mother as chaperone for a dinner and a sail on the yacht.

Among the guests was Miss Carolyn Foster of Waltham. Evidently the party was a success, for a year later Joseph Stickney and Carolyn were married. She was an able woman, of charm and good sense, who was a great help, when the Mount Washington Hotel was built, in attracting socially prominent guests.

At the private luncheon that Mr. Stickney gave to some twenty distinguished guests on the day the hotel opened, he listened to their words of praise. Then he stood before them, and said: "Look at me, gentlemen; look at me; for I am the poor fool that has built all this!" And then he had laughed heartily at his own folly.

But later, as he thought about the hotel, and more especially about the impression his wife was making upon the owners of the big New York fortunes, Joseph Stickney suddenly decided that this new hotel of his was going to be a competitor of Newport and Bar Harbor—that he was going to make it a great commercial success.

Prosperity came immediately to the new hotel, which swelled the

number of visitors to the White Mountains and added to the fame of the region. At a time when five dollars a day (American Plan) was rather the accepted thing, Mr. Anderson told my father that he could rent more rooms at twenty dollars a day than at five.

Mr. Stickney's complete plan never was realized, for on 21 December 1903 he died. Almost the only thing at Bretton Woods that bears his name is the beautiful Stickney Memorial Chapel built there by Mrs. Stickney, who inherited all of his fortune and the hotel. Five years after his death she married Prince Lucinge, who died from wounds received at Verdun in World War I. Upon her death, the Bretton Woods Company, together with her fortune, came into the possession of her nephew, F. Foster Reynolds, of Providence, Rhode Island.

It was after he had taken some bad setbacks during the depression of the 1930s, that Mr. Reynolds decided to tear down the famous Mount Pleasant House. "I won't have it bothering me any longer," he told Colonel Barron. And it was early in 1944 that he sold the entire Mount Washington Hotel property to a New York syndicate.

Some time after Oscar's death in 1913, to save some five or six hundred acres of timberland adjacent to the Fabyan House from falling into the hands of exploiters, Colonel Barron and John N. Conyngham, of Wilkes-Barre, Pennsylvania, president of the Bretton Woods Company, bought the Fabyan House from the Boston & Maine Railroad.

In February 1938 the hotel was sold to J. Alfred Seymour of Twin Mountain, a former engineer on the Mount Washington Railway, and his sister, Miss Mary A. Seymour. They operated the Fabyan House for three years, and then closed it at the opening of World War II.

In February 1946 the Seymours sold out to James Zacker of New York. After extensive repairs Mr. Zacker reopened the hotel about 25 June 1946. In 1951 it was completely destroyed by fire.

Finally the Barron brothers, "Billy" and "Hal," decided it was time to take things a bit easier, and in the spring of 1946, seventy-eight years after it was built by their father, the Twin Mountain House was sold to George Nichols of New York. The following spring, after some six months of negotiations, Colonel W. A. Barron completed the sale of the Crawford House, together with all the assets and shares of stock of the Barron Hotel Company. The new owners included B. F. McCutcheon, Princeton, New Jersey, W. J. Hammond, New York City, Henry H. Haynes, Lake Placid, New York, and Richard Edgerton, Mt. Dora, Florida. The most unusual part of this transaction was that

the sale was for cash, Colonel Barron receiving a certified check in full payment. This sale brought to a close the active careers of the most widely known family of hotel men with the most famous chain of summer hotels in the White Mountains, and the one most closely identified with Mount Washington history. They were the true successors, nearly a century later, of that pioneer hotel family, the Crawfords, with their Mount Crawford House at Bemis, the Notch House at Crawford, and the "Old Red Tavern with the Moose Horns over the Door" on the Giant's Grave.

9. Among the Clouds

OF ALL the spectacular records chalked up for Mount Washington, none is more filled with romance than the starting, in 1877, of the daily summer newspaper, *Among the Clouds*.[1] Summer newspapers were few at that time if, in fact, any existed. And even to this day there has never been another journal worthy of the name published on top of any other mountain in the world. For thirty-one summers *Among the Clouds* carried the news of the summit and of the nearby White Mountain resorts daily (for many years twice daily) to the world outside. Then the great fire of 1908 wiped out the printing office. After a lapse of two summers publication was resumed at the Base Station, where it was continued for the next eight seasons, until operation of the railway was suspended during World War I. Then the old paper was discontinued permanently.

In 1866 my grandfather, Henry M. Burt, founder and for twenty-two years editor and publisher of *Among the Clouds*, made his first ascent of Mount Washington on horseback from the Crawford House. His interest in the region had been kindled by reading Starr King's *The White Hills*, and he had taken upon himself the publication of *Burt's Guide through the Connecticut Valley to the White Mountains and the River Saguenay*.[2] His love for the mountains once kindled, Mr. Burt became a frequent visitor.

It was while storm-bound in the Summit House during the summer of 1874—noting that already the mountain boasted a railway and carriage road, a first-rate hotel, and both a post office and telegraph office—that he remarked: "There ought to be a newspaper here for those who have to wait for the clouds to lift." The thought crystallized into a plan. The railroad company and hotels offered hearty co-operation.

Three years later Royal Cummings of St. Johnsbury, Vermont, set up a Campbell cylinder press (turned by hand) in the front room of the old Tiptop House, which had become the business and editorial quarters as well as composing room and pressroom. For the first season Henry Burt had a full-time staff of four, with three other compositors who came in for part of the summer.

It was an exciting moment when the equipment . . . arrived on an open platform car pushed by a cog railway locomotive. Over an extemporized plank walk the heavy materials were dragged by railway hands up the rocky slope from the railway to the Tiptop House. Then followed several days of high tension as the press was set up and mechanical troubles dealt with, type set and proofs read. It was not until about half past four on the afternoon of Wednesday, July 18, that the forms were made up and on the press and the printing of the first issue begun.[3]

A week later the Boston *Transcript* commented: "The man who prints the paper at the Summit of Mount Washington regularly scoops in the old party who 'is proud that he once was a printer', and gets him to do a stickful of composition. It doesn't cost the printer anything to get such type-setting done."[4]

At the end of the first season, Grandfather Burt wrote: "It is not often that a member of the typographical fraternity has an opportunity to set type in so elevated a place as the Summit of Mount Washington, and those who came as visitors to the office of *Among the Clouds* availed themselves of the privilege. The list includes some of the distinguished people of the country—editors, authors, heads of large printing establishments, government office-holders, manufacturers, journeymen printers and others."[5]

It was soon found that what visitors wanted was a paper giving their own arrivals—not merely to see their names in print, but to let friends know of their visit. As one group of trains and stages arrived about noon and the other toward night, there was soon developed a system of two editions a day.

The printing office became one of the regular places to visit, second in interest only to the Signal Station, the home of the weather observers, and gave many visitors their first sight of a printing press. To many people the equipment was a puzzle, one bewildered woman asking in all seriousness: "What's this—a factory?"

Of *Among the Clouds* Frederick W. Kilbourne, author of that most valuable book, *Chronicles of the White Mountains*, wrote:

This unique and daring undertaking gained the admiration of all visitors, and the paper with so peculiarly appropriate a name soon filled a recognized position in White Mountain life. For eight summers it was printed in the old Tip-Top House. Thereafter until 1908, it was published in its own building, the erection of which in 1884 has been recorded. The genial editor, during the twenty-two years in which he conducted the paper, gained a host of personal friends among those frequenting the White Mountains and those carrying on business in the region.[6]

It was during that first season in the Tiptop House that my grandfather and his staff received a call from President and Mrs. Hayes and their party on their visit to Mount Washington. The President chatted cordially with Henry Burt, expressing amazement at such an enterprise—"the highest newspaper office he had ever seen"—and said he was glad to hear it was proving a success.

One of Grandfather's interesting friends, who became "copy" for *Among the Clouds*, was P. T. Barnum, the great showman. Commencing in 1850, Mr. Barnum made many visits to Mount Washington. In an interview in 1887,[7] he recalled that after returning from that first visit he "rode down the notch with old Crawford," as Abel Crawford, the "Patriarch of the White Mountains," was so commonly called.

A thoroughly practical newspaperman, Henry Burt had published newspapers in many places from Boston, Massachusetts, to Bellevue, Nebraska, as well as having founded a leading agricultural weekly, *The New England Homestead*. He was determined that *Among the Clouds* should be more than a mere souvenir. During the very first year he arranged with Samuel Dodge of Portsmouth, New Hampshire, editor of the Portsmouth *Journal* and agent of the Associated Press, to write a series of letters from the seashore resorts, and with Henry L. Lamb, State Superintendent of the New York Bank Department, of Albany, New York, to furnish Saratoga notes.

News from the entire mountain region was secured by frequent visits to the various hotels and also by having items mailed to the summit. This service was extended from year to year until the mountain region was covered systematically by three reporters. They lived through the summer at Bethlehem, Bretton Woods or Fabyan, and North Conway. Thus many college students earned a substantial part of their college expenses while having an exceedingly interesting summer. "Graduates" of the *Among the Clouds* reporting staff included Channing H. Cox, Governor of Massachusetts from 1921 to 1925 and later vice-president of the First National Bank of Boston and president

of the Old Colony Trust Company, and his brother, Louis S. Cox, justice of the Supreme Judicial Court of Massachusetts. Another illustrious "alumnus" was Governor Cox's friend in Dartmouth College, John H. Bartlett, later Governor of New Hampshire. Still another was John Scammon, a justice of the Supreme Court of the same state.

Mr. Burt had a lively sense of humor. When news was scarce for early editions he found no difficulty in writing pithy "fillers." In his second edition, he extended this invitation: "The visitors at this office who cannot set type are permitted to exercise themselves after walking up Mount Washington by turning the wheel of our press. It is very healthful."[8]

Perhaps the most romantic use ever made of the slideboards on the cog railway, was in connection with the early-morning delivery of special editions of *Among the Clouds* on the day following the Coaching Parade in North Conway or Bethlehem in order to reach readers in those places before the breakfast hour, and thus to "beat" all the city newspapers.

Reporters for the mountain newspaper, after witnessing the parade, took the first train to Fabyan in order to catch the last train for the summit. Writing their reports as they traveled to the mountain, they turned the copy over to compositors in the printing office. Type was set, proofs read; and the papers were printed, folded by hand, and bundled for ease of handling on "the fastest newspaper train in the world." At three in the morning the bundles were handed to the railway men, and in less than ten minutes they were at the Base. There a wagon with a team of fast horses waited to take the papers to Bethlehem, or to deliver them at Fabyan to the first train going down through Crawford Notch to North Conway.

Grandfather Burt had a slight limp, a fact that had caused his rejection three times from Army service in the Civil War, yet he became one of the best-known mountain photographers of the eighties and nineties. Many a clear day in summer he could be found somewhere above the timber line on Mount Washington, his long white beard streaming out like a pennant in the wind, his keen blue eyes twinkling as he searched for a new angle from which to catch a well-loved view. His constant companion and camera-toter was Edward J. Mehan, for some twenty summers foreman and pressman for *Among the Clouds*.

Mountain photography in those days was no child's play. It was long before the days of the Speed Graphic, the folding Kodak, or the

spool-rolled film. Henry Burt's camera was contained in a great square box measuring at least a foot on either side, and "weighing a ton." The plates were glass five-by-sevens, adding further poundage. To take a picture it was necessary for Ed Mehan to attach the big box to a tripod, set it up as securely as possible, often with stones against the feet of the tripod for ballast, pull out the bellows of the camera in front, and then hang on for dear life lest the whole affair be swept away by the force of the prevailing wind.

Once on the headwall of Tuckerman Ravine, the pair met a mountain guide. He cautioned Henry: "Be careful not to fall here. It's dangerous. But if you do fall, remember to look to the right. You get a wonderful view on that side." Then he went his way.

Grandfather simply had to take that shot of the headwall of Tuckerman Ravine with the Fall of a Thousand Streams. As Ed Mehan told the story the year after the old gentleman died:

> The only way to get the view Mr. Burt wanted was by crawling out on an overhanging thin shelf of rock about quarter-way down the trail that skirts the headwall, and a little to the left of the trail. I saw the danger of the operation and had crept out on the rocky shelf, which projected some six or eight feet into the air, and was down on my hands and knees examining the under side of the shelf, while Mr. Burt stood by. He laughingly made some remark and I was about to reply when I felt the rock tipping and sliding out of its bed. I reached back quickly with my right hand and got a firm grip on some scrub spruce. As I did so Mr. Burt lost his balance and as he fell forward he grabbed my left arm and with our weight combined the spruce gave way. Mr. Burt fell about thirty feet, striking on his back among some brush and moss. I struck close to him but rolled off and fell about ten feet lower among a lot of scrabble. Why we did not follow that great rock which we could hear crunching and grinding hundreds of feet below us, I cannot explain.[9]

As soon as Ed was able to move, he went to his friend's assistance. After he had rubbed Grandfather's back for a long time, they started their painful hike back up to the summit. But as they started the old photographer told Ed: "We shan't be able to come down here again, and you had better take the picture." And it was a very good picture. Although my grandfather received injuries from which he never fully recovered, he never mentioned the accident to the family. He died at his home in Springfield, Massachusetts, in March 1899 in his sixty-eighth year.

Next summer my father, Frank H. Burt, took over the publication of



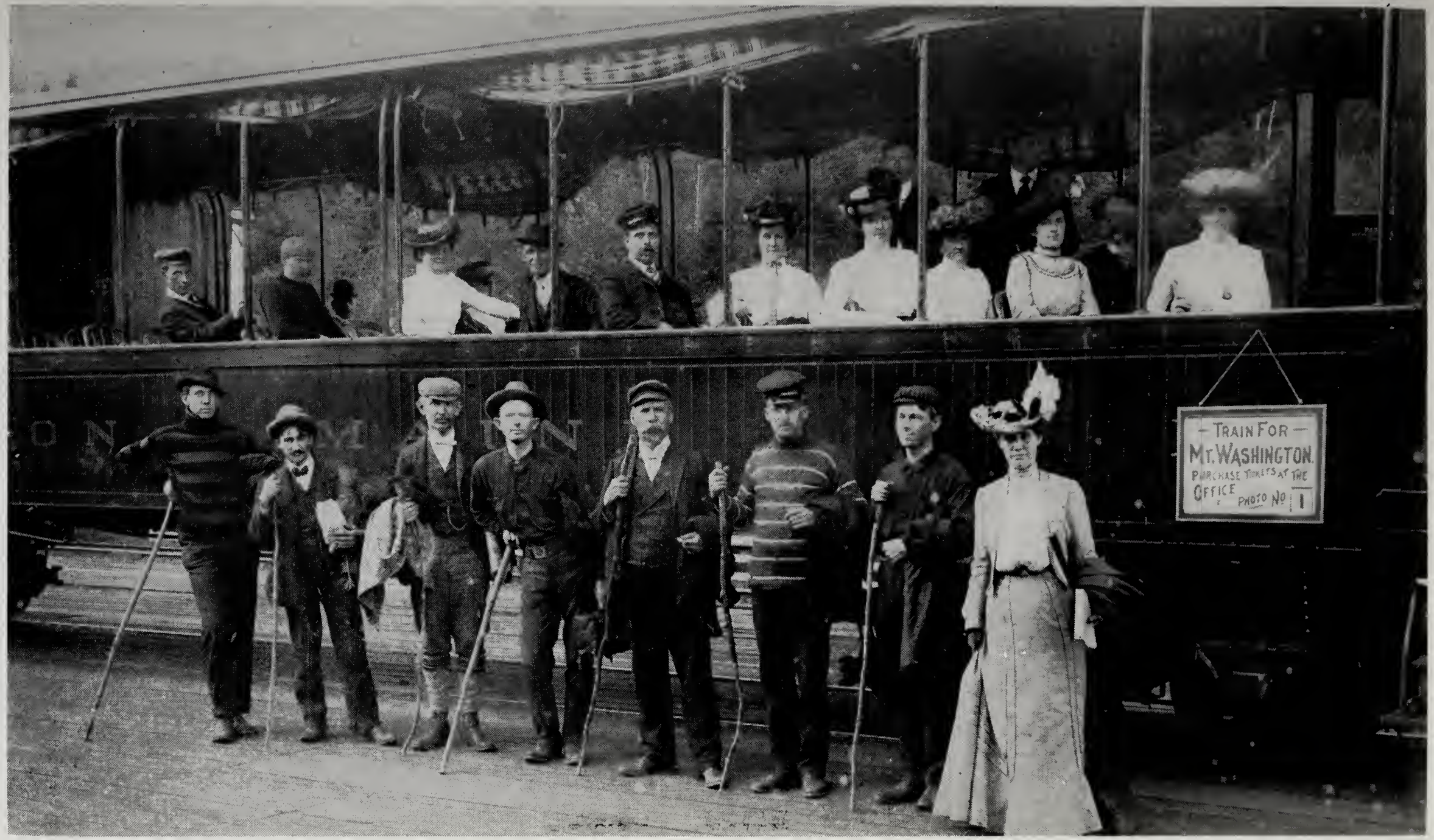
Slideboarding *Among the Clouds* to the Base to "beat" city dailies.



Interior *Among the Clouds* office. Editor Henry M. Burt at desk; pressman Ed Mehan at Hoe cylinder press.



Henry M. Burt, publisher of *Among the Clouds*, at right, with Robert Dunham, associate editor, formerly of *The Boston Evening Transcript.*



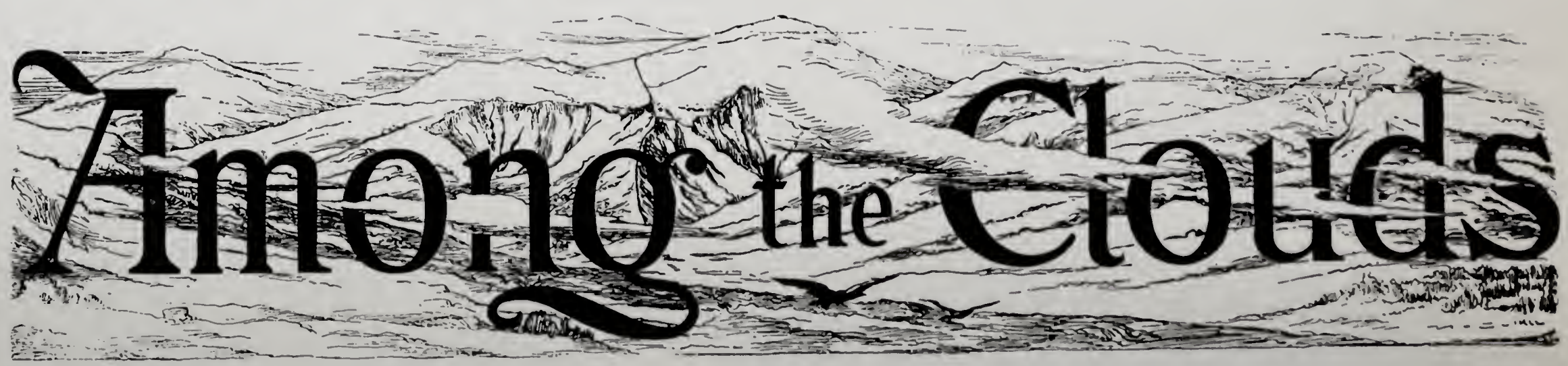
Staff of *Among the Clouds* at Fabyan about to board observation train to the Base. Third from left is Frank H. Burt, editor and publisher; then Charles Carr, veteran of Teddy Roosevelt's Rough Riders; and Robert Dunham, associate editor.





Banner head of *Among the Clouds*, 1879–84.

First office of *Among the Clouds* in the Tiptop House.
Note hand-powered cylinder press.



Banner head from 1885, designed by Frank H. Shapleigh, prominent Boston artist.

Among the Clouds. During the nine years in which he ran the paper, he was fortunate in having the devoted help of the long-time associate editor, Robert C. Dunham, formerly of the *Boston Evening Transcript*, an enthusiastic lover of the White Mountains, whose wise counsel for amateur climbers was "Don't monkey with Mount Washington!" In 1904 and 1905 there was another valuable addition to the editorial staff in the person of Norman H. Libby of Bridgton, Maine, who in 1905 made the first ski descent of the mountain. For the two final years on the summit the editor's sister, Miss Grace M. Burt of Newton, Massachusetts, a graduate of Mount Holyoke College, acted as assistant. A pleasant incident of that time was an informal evening visit from Mrs. Grover Cleveland (later Mrs. Thomas J. Preston, Jr.), who had walked up the Bridle Path with a few friends and dropped in at the printing office for a friendly chat.

Twice near-tragedy hit the printing office in the old Tiptop House. The first time was on Saturday, 16 July 1881. My father wrote:

> It was on a rainy afternoon . . . in the midst of a high wind, that we were startled by a sound as if a small cannon had been fired almost at my feet, and a bolt of fire seemed to dart through the room, followed by a sulphurous odor. As I wrote at that time, "The noise at first was stunning and none could at once realize what had happened, but as the scattered senses returned a general sensation of numbness proved that we had been struck by lightning." The bolt had cracked every pane but one in the window a few feet from me, had thoroughly mixed the type in a case which the compositor had left but two minutes before, and ended its mad rush by upsetting a washbowl full of water.
>
> In the Summit House kitchen the help declared that a ball of fire came down the chimney, sending one girl into hysterics, then danced around the walls and departed the way it came. Wires were melted in the telegraph office and a hole burned in the weather man's felt hat, while the theodolite in the Geodetic Survey station was badly damaged.[10]

It was on 28 July 1883, during a drizzling rain, that the Tiptop House was struck a second time. But this time my grandfather was seriously injured. As he wrote afterwards in the Newton (Massachusetts) *Graphic*, which he was then publishing:

> I was standing at a window between the editorial table and a stand of type, and only a few feet from a stove from which an iron smoke pipe led to the roof.
>
> Presently I felt a severe thrust in the back and a most excruciating pain in the left foot. I could not imagine the cause; but instantly there appeared

a large, dark red ball of fire in front and a little to the right. A terrific explosion followed and then all was explained. I realized that I had been struck by lightning, and was startled and confused in mind. I clenched the table on one side and type stand on the other, endeavoring to hold myself up. I had the feeling that something had gone through my body and all below was gone. I exclaimed, "I am struck! Open the door and give me air!" and down I sank to the floor. My printers sprang to their feet and one of them replied to my exclamation, "So am I," and all then went plunging and reeling to the door and out of it toward the hotel. Such expressions of fear and surprise I had never before seen on human faces.

In a few minutes they returned with help, and as I lay outstretched on the floor they supposed I was dead. They lifted me up and carried me to a room in the hotel where I was carefully and skilfully treated, and after two or three hours of hard rubbing my paralyzed limb was relieved. The electric current had taken effect in the small of the back, just left of the spine, and had passed down the left leg, between the toes and out through the sole of the boot, leaving unmistakable traces in its course. . . .

Had the current been a little larger or had it struck a vital point, life would have gone instantly out. . . . The thoughts that were flashed through the mind with the first shock were indelibly impressed, while all that followed is vague and uncertain.[11]

Fortunately a medical student, Dr. F. E. Strong, was spending the summer working for Mrs. Dodge at the Summit House. Under his directions Henry Burt's life was saved, and Grandfather was able next morning to join his family at the Mount Pleasant House, where he startled them with the laconic remark, "I've been struck by lightning." The congested blood in the veins of his back produced the appearance of a tree. There is an old superstition that such a "tree" is imprinted in some mysterious manner on a person struck by lightning.

At that time there was a notion prevalent that if a victim of lightning were buried in the ground the electricity would be drawn from his body. A fantastic tale found its way into the press and was quoted far and wide that Mr. Burt was taken to the Base Station on a slideboard and buried in earth up to his neck until the effects of the shock were relieved.

Henry Burt was fifty-one years old when this happened. For the next sixteen years he continued to build lasting friendships for himself and for his beloved mountains. How much his work was appreciated is shown in the following:

Soon after the death of Henry M. Burt, the founder of *Among the Clouds*, and for 22 years its editor, it was suggested that a fitting tribute to his

memory and to the work which he did for the White Mountains in making them better known to the world, would be to give his name to the great ravine which lies between Mounts Washington and Clay, into whose depth every passenger on the Mount Washington railway looks from Jacob's Ladder and the long stretch of high trestles above it. The proposition met with the approval of prominent hotel and railroad men and of local officials; and at a meeting of the Board of County Commissioners of the County of Coos the following order was passed, giving to this great gorge the name of "Burt's Ravine":

> We, the commissioners of Coos County, hereby name the ravine near the track on Mount Washington Burt's Ravine, in honor of Henry M. Burt, the founder of the first newspaper edited on the summit of Mount Washington.
>
> C. E. Philbrook, Henry B. Gilkey, S. R. M. Ramsey,
> Commissioners of Coos County.
> West Stewartstown, N. H., July 31, '01[12]

Father's work as editor and publisher ended when the plant was destroyed by the fire of 1908. In 1910 Reginald H. Buckler, who had worked on *Among the Clouds* during the season of 1907, revived the paper and printed it at the Base Station until war conditions caused the railway to suspend operation for the summer of 1918. By that time Mr. Buckler was established in the hotel business both in Bethlehem, New Hampshire, and in St. Petersburg, Florida, and could not go on with the paper. So, forty years after its founding, the famous mountain newspaper passed into history.

Thursday, 18 June 1908, was the end of an epoch for Mount Washington. It had been an era of comfortable living and small excitements: good beds and the best of food in the big Summit House, always under the watchful eye of its long-time manager, Miss Mattie A. Clarke; swapping yarns around the big-bellied stove in the hotel lobby, and watching for the twice-a-day arrival of the trains and the two-a-day editions of *Among the Clouds*—and as a foretaste of the tempo of the new century, marveling at the coming of the automobile.

Mount Washington was slowly emerging from the hardships of the primitive past, was readying itself for still undreamed-of advances. The passing of Passaconaway, sachem of Pennacook, in a car of flaming fire from the summit of Agiochook to a council in heaven marked the end of the Red Man's supremacy over the White Hills. The events of that night of 18 June seemed for a time to have ended the rule of the

White Man over Mount Washington, but in reality it ushered in a new era of travel and of scientific research.

It had been one of those glorious days of late spring when the air is as clear as a looking glass. The sun shone warmly on the summit of Mount Washington, where men were rushing the work of putting the hotel and the railway in readiness for summer business.

Miss Clarke was to arrive the following Sunday with the help. The house was to open Monday the twenty-ninth. The section of track along the platform in front of the hotel had been newly rebuilt. In the Summit House, the men, under the direction of Superintendent John Horne of the cog railway, had been busy for several days clearing away the winter's accumulation of cobwebs, wiping the mildew off the furniture, sweeping the carpets, painting and cleaning to be ready for coming guests. The telephone was put in. Soon after half-past four in the afternoon, the train left to take the workmen to the Base for the night.

Before the train left, a party of young people from Berlin came over the range from Madison Spring Hut, prepared to spend the night on Washington. As the hotel was not ready for business, they were told to use the stage office. As one of the party wrote many years later:

> We were just finishing our supper, and the train crew had only been gone a short time, when one of the teachers in our party came running into the stage office yelling, "The hotel is on fire!" We all ran out of the stage office to the hotel but found the doors and windows locked tight. The smoke was pouring from the south top windows, and as not any of us were familiar with the house we were at a loss what to do.[13]

Finally the party forced a window and got inside the house. But the fire had too much headway. The old wood, thoroughly warmed by the June sun lying all day on the roof, was like tinder. Seeing the hopelessness of stemming the fire, they rushed to the telephone in the office and tried to call the Base Station for help. They did not know the workmen had disconnected the phone before leaving. Seeing that there was nothing they could do, four of the younger boys were sent hurrying down the carriage road to give the alarm.

The train had reached the Base, the men had had supper and were ready for a quiet evening's rest when there came a sharp ring at the telephone. "The Summit House is on fire!" was the startling message from the Fabyan station. So closely is the Base Station planted under the slope of the mountain that the Summit House could not be seen from it and no sign of the fire had been discovered. Speedily the train

was made ready and the whole force of employees except a single train crew set out for the summit, with Superintendent Horne in charge and Engineer Eugene Armstrong in the cab. Soon the glow of the fire could be seen in the sky, as well as the rising smoke, but not until the Gulf Tank was reached were the flames actually seen. Mounting against the clear, starlit sky they presented a weird appearance. Drawing nearer to the top it could be seen that the Summit House was already a mass of flames, and that it would be impossible to run the train to the platform. Accordingly a stop was made near the drainage chute, a few rods below the water tank, and the men made their way on foot to the top.

The Summit House roof was already gone and the fire was working its way to the cottage. The stage office had fallen in, and curiously enough the smoke from a fire in the stove was still rising from the chimney in the midst of the ruins. The printing office was ablaze and the long train shed had already been completely destroyed. Fire began to creep up the plank walk toward the old Tiptop House, and Mr. Horne ordered it cut. The precaution proved unnecessary, as the high wind kept the flames from traveling further. Soon the Signal Station caught from the fire in the train shed's ruins and an unbroken line of flames surmounted the crest of the peak.

Nothing could be done to stay the whirlwind of destruction and the train crew could only look on and watch the progress of the flames while thinking of the changed conditions and increased hardships which were to attend their summer's work.

On the east side the news of the fire traveled as rapidly as on the west. It was seen at the Glen House by the housekeeper, who at once telephoned to the E. Libby & Sons Company at Gorham and to the Halfway House. Superintendent George C. Baird of the carriage road, with his employees, at once hitched up a team to start for the summit. While they were busy with the horses the four boys from the Berlin party came down the road. Near the five-mile post Mr. Baird met the rest of the party, one of whom, a young lady teacher from Berlin, said that the flames had first been seen breaking from a window in the corner of the hotel toward the printing office.

Mr. Baird and his party reached the top in time to see the fire at its height. The wind which spread the fire so swiftly from house to house was the means, Mr. Baird said, of saving the stables. Again and again were blazing fragments of shingles and clapboards hurled on the roof of the upper stable, only to be lifted in an instant by the next gust and

sent flying toward Tuckerman Ravine, so that the roof was hardly scorched. Before midnight the fire had burned itself out, and the spectators left the summit, so sadly changed in appearance, to keep a lonely watch over its own ruins.

At the Fabyan House the discovery of the fire was made probably within a few minutes after its breaking out. The sun had already set in the valleys, but on the peaks the light still lingered, for this was almost the longest day of the year. Mr. Trafton, the bookkeeper, had come out from supper with two friends and caught sight of a glow on the Summit House. Thinking, as did others who saw it, that it was the reflection of the setting sun on the windows, he called to the friends who were following him, "Come out here quick if you want to see a pretty sight." At the same instant Harry B. Warden, the clerk, detected a flickering of the light, which revealed the true situation. Oscar G. Barron, who was at the cottage, was hurriedly called by telephone and came out and looked at the mountain. The flame had died down and Mr. Barron said, "Why, that's what I have seen a thousand times—just the sun shining on the windows." But another outburst of flame confirmed the alarm, and immediately the telephone had carried word to the Base. Colonel William A. Barron was summoned from the Crawford House and the group of sorrowfully interested spectators kept watch as long as the flames lighted up the slowly darkening sky.

Of the buildings destroyed, the Summit House, cottage, trainshed, and printing office were owned by the Mount Washington Railway Company, the stage office by the Mount Washington Summit Road Company (controlled by the E. Libby & Sons Company), and the Signal Station by the United States Government. The hotel was fully furnished. The Signal Station had been abandoned for many years, and contained merely old furniture. The printing plant of *Among the Clouds* included a Hoe cylinder press, an Alamo seven-horsepower gasoline engine, nearly new, and a comparatively new outfit of type. A nearly complete file of the paper was destroyed, but the editor fortunately had a duplicate file at home. Files of the paper from the beginning are kept in the State Libraries of New Hampshire and Massachusetts, the library of the Appalachian Mountain Club in Boston, the Bretton Woods Library, and the Gorham Public Library.

At first it was thought that plans should be drawn up immediately for a new Summit House, to be opened in August. But in view of the uncertainty of the weather and the hardship of building against time on so exposed a spot, it seemed wisest to wait. Also it was recalled that

it had taken two years to build the Summit House and that two hundred fifty trainloads of material were required.

One immediate problem was restoring the tracks in front of the Summit House. Along the whole length of the platform the railway ties and supporting timbers had been burned and the rails twisted into a hopeless mass.

"We must have that track and a platform ready by the twenty-ninth," was Mr. Horne's word to the veteran roadmaster Patrick Camden. And ready it was, though on the last day the wind was so furious that while a carpenter was using the auger another man had to hold him down to keep him from blowing away. So the first regular passenger train made its trip on Monday, 29 June, according to schedule.

At the same time the repairs to the old Tiptop House were hustled along, and on the first of July, entirely renovated within, it was ready to receive visitors.

That summer of 1908 the stage office was rebuilt. The upper story was left as one big bunkroom, with a row of big beds piled high with blankets. All one had to do to retire was remove one's shoes, take off extra heavy outer garments, and crawl in between the blankets.

Many were the pleasant memories that clung to the old Summit House, and especially to that big round stove in the office, in whose radiant heat basked each evening a group of contented folk—trippers, hikers, scientists, poets, guides. All were "copy" for *Among the Clouds*, and all helped in various ways to weave some of the threads of *The Story of Mount Washington*.

10. Climbing

BECAUSE the great majority of visitors to Mount Washington make the ascent on foot, it may be worth our while to become better acquainted with some of the joys and some of the dangers inherent in this activity.

First of all, this is a comparatively new sport. For more than 200 years after Darby Field's ascent in 1642, only a few of the world's great mountains had been scaled. Mont Blanc was first climbed in 1787, but it was not until 14 April 1865 that the Matterhorn was conquered. At that time horseback riding to the summit of Mount Washington had already become a popular adventure.

Of course, there is always the weather to contend with on Mount Washington. A gorgeous summer day in the valley may turn into a blinding snowstorm on top of the range. Any one who has visited the summit many times knows how seldom the weather on top is perfect for views or for hiking. All too often the world below is blotted out by cloud and rain.

The variety seen in cloud effects is one of their principal attractions, and a person might remain on Mount Washington for a lifetime and never see a scene exactly repeated. In details, the same combination never appears twice. One often stands on the summit and looks out upon a sea of mist glinting in the sunlight. Sometimes the clouds are hundreds of feet below the summit. In that case innumerable mountain peaks poke through the clouds, like islands in an ocean bounded only by the sky.

When a storm is clearing and the sun shines suddenly upon the immense masses of clouds that are floating away and, as it were, re-arranging themselves for pleasant weather, the scene is indescribably beautiful. No less so is the scene when the bright sunlight plays upon

the huge cloud banks that rise from the ravines and notches in the immediate vicinity of the summit.

Rainbows are at their finest when caught upon a cloudbank and viewed from a nearby mountain top. Sometimes they play queer antics. And sometimes they are not true rainbows at all, but coronas.

One lovely summer afternoon Father and I had wandered down from the summit and stood on the very tip of Boott Spur. Across Pinkham Notch the great shadow of Mount Washington rested upon a mass of white clouds. Against the top of the shadow appeared our two shadows, clearly defined, and surrounded by a circle of light, or corona, that fitted around us from head to foot.

A similar corona appeared to S. A. Nelson, of the first scientific party to spend a winter on Mount Washington, as he and Professor Hitchcock of Dartmouth sat on the roof of the Tiptop House on the morning of 29 April 1870, looking down on a sea of clouds. Said he: "A luminous corona, showing from one to three distinct circles with the prismatic colors, was thrown upon the clouds around our shadows. It was in some respects like the spectre of the Bröchen."[1]

However, climbing on Mount Washington is not all clear moonlit nights or gorgeous coronas or brilliant rainbows. Mount Washington weather is full of sharp and sudden contrasts. A beautiful morning in the lowlands may be the forerunner of a terrific ice storm on the big range. It is the unexpectedness of storms such as the one that caused the Willey disaster that hold an ever-present threat of danger to the inexperienced climber, or "goofer," as he is known to old-timers on Mount Washington. Sometimes goofers will also add to their inexperience recklessness and an unwillingness to accept advice. But fortunately, most goofers are merely the cause of merriment among more experienced climbers.

There was an Englishman who came to E. A. Crawford's popular hotel in Jefferson Highlands to do a "bit of tramping in these foothills." At that time, around 1900, Ethan Allen Crawford III had as his guests some of the most enthusiastic White Mountain climbers. Among them was George H. Hallowell, famous for his paintings of wild life among the White Mountains, who later married Ethan's daughter Lucy.

Hallowell invited the English visitor to join a party to climb Mount Madison, cross the range to Washington, and return. The invitation was accepted cordially, though in the manner of one accustomed to more exciting adventure.

Early next morning the party assembled for breakfast. Last down

the stairway came the newcomer. George Hallowell took one look at him, and whistled. The Englishman was resplendent in full regalia for a hike on some Scottish moor, complete to walking boots that laced right up to his knees.

"My friend," said Hallowell, "I am afraid you may have trouble with those boots on the rocks and steep trails."

His new friend looked pained. He had climbed in the Alps—real mountains—and he knew how to dress for tramping through the "hills." So the party breakfasted. Then lunch boxes—big ones—were slipped into packs for the men to shoulder, and everybody climbed into the high, comfortable "mountain wagon" with its six wide seats. The driver took his foot from the brake beam, cracked his whip, and the four horses lunged forward with a creaking of leather, a crunching of gravel under wide iron-shod wheels, and the rattle and clatter of a heavy wagon off for the beautiful drive to Randolph where the climb began.

As the day wore on, and the sun grew hot and the trail steep and rocky, especially on the downgrade where every leg muscle was straining against a sudden drop, the high boots cramped the Englishman's muscles, and the top rims cut painfully just behind his knees. It took every ounce of British fortitude to complete the trip without complaining.

However, the worst ignominy was yet to come. For next morning, as George Hallowell stood at the foot of the stairs waiting for the breakfast bell, he heard a grunting sound. Looking upwards he saw the owner of the high boots descending the stairs stiff-legged and—backwards!

Such a climber becomes a legend among hut-masters in the stone huts of the Appalachian Mountain Club, perched on the rim of the Ammonoosuc Ravine near the Lakes of the Clouds and in the col between Mounts Madison and Adams. He runs a close race for curiosity with the man who once appeared at the former hut clad in evening clothes, complete with patent leather dancing pumps. The hutsmen never found out whether he was the victim of a bet, a gag, or too much liquor. He merely paused casually, and then left for the summit of Washington without explanation.

Sometimes a lady climbs in high heeled slippers, and descends almost barefooted. Or a young man tries a winter climb insufficiently clad. He may live through the experience, but on one occasion, out of a party of three, two thus attired perished.

All such are members of the great army of goofers who yearly climb the mountains in all sorts of unusual dress; who take off sweaters and lie down in the breeze to cool off; who smoke too much while climbing, or resort to a flask for courage to finish the struggle against wind and trail. They are the amateurs of whom it has been written:

A goofer is a person, male or female, who wanders about the mountains without proper shoes or clothing, who doesn't know that stone cairns[2] mark the trails and so think it great sport to tumble them over . . . a person who ignores signs about turning back in case of rain, clouds or other weather hazards. And a goofer is one who walks into the Lakes of the Clouds hut, where every morsel of food and every other thing used in the sky hostelry has to be brought down from the summit on the backs of the hutsmen, and expects hotel service deluxe.[3]

The Forest Service, Army, Navy, and Air Force personnel, as well as television men and weather observers, have all contributed to the safety of climbers, especially in winter. First-aid stations, complete with blankets and toboggans, are maintained by the Forest Service at both the Halfway House and on the summit. The six-mile shelter on the auto road has been supplied with K-rations sufficient to maintain several men for a number of days. It is no rare occurrence for one or more men to be marooned for a day or more at either Halfway or Six-Mile. And it is of the utmost importance that emergency supplies are there, and that there is the opportunity to light a fire and keep warm. Also, it is of equal importance that doors be carefully shut and latched, and that snow be kept outside. To arrive at night at a hut, in a howling blizzard, only to find the floor piled high with snow, the walls perforated by the artistic efforts of vandals, and the supplies used, stolen, or thrown about the room, may mean death by freezing and exposure for the innocent victim. Such conditions seem to follow inevitably in the wake of some goofers. But they are in the minority. The great majority of inexperienced climbers are funny, but not malicious.

But there is always the danger that even an experienced climber may be overtaken by one of Mount Washington's sudden sleet and ice storms, even in midsummer. This and other causes have set up an appalling record of tragedies on New England's highest peak.

The story of Mount Washington's first tragedy, the death of Frederick Strickland, second son of Sir George Strickland, Bart., M.P., of Bridlington, England, at the age of twenty-nine, has been fully told by my father, Frank H. Burt, in *Appalachia*,[4] after considerable research. His is the only complete and accurate account of the event.

On Friday, 19 October 1849, Strickland and another Englishman set out with guide and saddle horses from Tom Crawford's Notch House, against advice, to climb the mountain. They found the snow so deep that when Mount Pleasant was reached the guide refused to risk himself and his horses further. Despite the urgent appeals of his companions Strickland left them, intending to continue alone to the summit of Mount Washington and go down the Fabyan path to Horace Fabyan's Mount Washington Hotel.

Strickland reached the top of Washington safely and passed over the most dangerous parts of the descent, only to lose his path in the woods. Two days later his frightfully bruised body was found in the rocky bed of the Ammonoosuc. Unaccompanied, climbing a strange path, he had made one of the first recorded ascents of Mount Washington under winter conditions, only to die almost within reach of help. He appeared to have fallen into a little pool, then ripped off his frozen trousers and drawers, and struggled along for about a mile, leaving a trail of blood, falling several times until he could no longer rise.

As subsequent fatalities have been covered rather fully in other publications, it has seemed to me that for the purposes of this book it may be sufficient to enumerate them chronologically in the notes.[5]

Of all those who have lost their lives on the Presidential Range only four were women, and the majority were under thirty years of age. So it is natural to ask: When so many people make their way up and down Mount Washington in safety both in summer and winter, why have so many died so tragically? The Appalachian Mountain Club has this to say:

> The appalling and needless loss of life on this mountain has been due largely to the failure of robust trampers to realize that wintry storms of incredible violence occur at times even during the summer months. Rocks become ice-coated, freezing fog blinds and suffocates, winds of hurricane force exhaust the strongest tramper and, when he stops to rest, a temperature below freezing completes the tragedy.[6]

To this might also be added: To climb in shorts in wintry weather is to invite disaster, as has happened more than once.

There have, of course, been countless accidents on Mount Washington, and many near-tragedies that can be recalled. Two of the most dramatic of these might be entitled: "The Life-Saving Umbrella," and "The Young Lady Who Broke Her Neck."

In the case of Dr. Benjamin Lincoln Ball, a young Boston physician, the length of time during which he endured the fury of Mount Washington weather, added to the fact that his miraculous escape from death was due in large measure to his medical training, which made him know the fatal danger of permitting himself to go to sleep, and to the providential rainstorm that prompted his taking an umbrella on the climb; all combine to make his account[7] an epic of hairbreadth escape.

An experienced mountaineer, Dr. Ball had made several difficult and dangerous ascents among the Alps and in Java. On 22 October 1855 he met in Boston the Reverend Thomas Starr King, whose description of the White Mountain scenery aroused Ball's interest so keenly that next day he started for the mountains. Hiring a horse in Gorham, and with his umbrella for protection, the doctor rode to the Glen House in the pouring rain.

Hearing that there was a road to the Camp House at the Ledge (now the Halfway House), and a bridle path to the summit, the doctor walked up to the Camp House, and then pushed on in the freezing rain, breaking through the crust of snow at every step. After an hour of this useless exertion he turned back to the Camp House, where the three workmen did their best to make him comfortable.

After a sleepless night, Dr. Ball was told of the recent death of Lizzie Bourne, who, with her uncle and cousin, had gone on despite warnings of stormy weather ahead. She had died that night of cold and exhaustion while enveloped in a thick cloud at the foot of the last steep rise to the summit. The doctor, also, was urged not to climb further. But the rain had lessened and the snow had left the bridle path, and, armed with a cane and his providential umbrella, he started upward.

Soon the path disappeared completely, but on he went, breaking through the crust and finding it difficult to walk. The wind grew to hurricane violence, the temperature dropped sharply, and the rain changed to sleet and then to fast-falling snow. Now the violent wind threw him to the ground over and over again, while the piercing cold covered his face with ice. His legs were so benumbed by the cold that he could hardly walk. Only by plunging ahead between gusts, by the aid of the cane, could he make any progress. Suddenly he came to a level space he thought was the summit. But here, he says: "If ten hurricanes had been in deadly strife with each other, it could have been no worse."

Not finding the Summit House, but discovering that he was slipping into a lethal sleep, he turned to retrace his steps. Stakes that marked the route of the carriage road led him to the edge of the scrub growth, where they stopped. Almost frozen and with night coming on, the doctor realized that his only hope for life was shelter. This he provided by opening his umbrella over a little cleft between a flat rock and a clump of dwarf firs. With the greatest difficulty, because of the numbness of his hands, he tied the handle to a strong root, and with all his remaining strength pulled up the tough bushes by the roots and piled them upon the umbrella, making the sides of his little camp tight with crusts of snow and tops of fir trees.

Unable to make a fire, he crawled into the shelter of the umbrella, keeping himself awake and alive during that awful night by putting his body into one uncomfortable position after another. In the morning the snow had stopped, but the wind was still cold and the clouds low above him. It took him two hours to get enough circulation in his frozen feet to manage to walk. Through that whole day he wandered in the fog, his feet breaking through crust that covered eight or ten inches of snow, his parched throat burning with thirst which he vainly strove to quench with bits of ice. Unable to break through the scrub, he dragged himself along for four hours, and then back whence he had come.

His greatest disappointment came when he saw on a cliff above him two guides whom Landlord Thompson of the Glen House had sent to hunt for the doctor. They found his tracks, but failed to see or hear him.

By chance Dr. Ball found himself at nightfall back at his former camping place. Now more than ever frozen, hungry, and almost dying of thirst, he protected his numbed body as on the first night, and somehow managed to live without sleep till morning. Fortunately Saturday dawned clear. It took him two hours to make a start of walking, this time going in the opposite direction from the previous day.

Toward noon he saw a group of men a hundred feet higher up the mountain. He shouted to them, and they looked at him in wonder and amazement. The first to reach the doctor was Joseph S. Hall, who, a month earlier, had carried Lizzie Bourne's body to the Glen. Mr. Hall asked several questions, and could scarcely believe that this was the man who had left the Glen House Wednesday afternoon.

Dr. Ball was unable to swallow food, and the guides had neglected to bring any drink with them. Finally he got some relief from two swallows of water from a little hollow on top of a rock.

Throwing his arms around the necks of two of the men, he was helped along to the path and down to the Camp House. Here his frozen feet were plunged into cold water. After a short rest he was carried on the back of a careful horse down the road till the party met Mr. Thompson with his carriage and span of horses. He had been notified by signal flags of the finding of Dr. Ball's "body," and had followed the party through glasses as they descended. Mr. Thompson's welcome to the doctor was: "You have been through what no other person has, or probably will again, in a thousand years." It was the first of March 1856 before the doctor's injured feet and hands were again moderately usable.

In all the history of Mount Washington there is no record of anybody else living through sixty hours of exposure, without food, drink, or sleep, battling a winter storm with no shelter but an umbrella. As Mr. Hall wrote to Dr. Ball's brother, "There is nothing in the history of the White Mountains to compare with this case of your brother; and I am very sure its parallel will not be known in time to come."

Our second "most amazing" escape from death on Mount Washington was the ordeal of Miss Jessie M. Whitehead, daughter of a Harvard University professor, and Walter Knight Sturges, both experienced mountain climbers, on 2 January 1933.[8] While they were climbing roped together in the Odell Gully of Huntington Ravine, Miss Whitehead paused to cut steps in the ice; her companion lost his footing, and they both were dashed down a precipitous ice-fall.

Miss Whitehead fell a distance which she estimated at 140 feet, landing on the back of her head and shoulders and fracturing and dislocating neck, shoulders, and upper jaw, then sliding several hundred feet further over the ice. Young Sturges brought up near his companion and escaped with three broken ribs.

They were knocked unconscious by the fall. When they had regained their senses, Sturges staggered down the trail a quarter of a mile in search of help and collapsed.

A. B. Callender, a student at Massachusetts Institute of Technology, climbing with a friend on the headwall of Tuckerman Ravine, heard Sturges shouting for help. Immediately starting down, the two men reached the injured climbers in about half an hour. Leaving his companion with them, Callender hurried down the winding path leading to the junction of the Tuckerman Ravine ski trail a mile and a half farther down the mountain. There he met a party from the Harvard Mountaineering Club. Callender paused only long enough to explain the situation to the leader of the party, Bradford Washburn.

As this party approached the boulders in the floor of Huntington Ravine they met Sturges walking slowly and dazedly downward by himself. He directed them to help Miss Whitehead. The Harvard men cut two eight-foot poles from a clump of scrub trees and went up the slope to where Miss Whitehead lay. A stretcher was fashioned out of poles, clothing, and a few bits of rope.

Miss Whitehead was suffering extreme pain, and darkness was fast approaching as she was placed on the stretcher. Both she and the man who had been sitting beside her were numbed by the cold.

Now a man took each end of the two stretcher poles, and the descent of the steep snow slope leading to the tree line was completed in about twenty minutes.

Meanwhile Callender had reached Pinkham Notch Camp, and a second rescue party of five men, headed by the camp director, Joseph Brooks Dodge, had started up the trail with blankets, an extra stretcher, and stimulants. At the end of two miles, which took them about an hour, they met Sturges being helped by two young men and a woman, also members of the Harvard party. Sturges was placed on the stretcher Dodge's party had brought, and one member of the party helped the two men and woman carry him to the Camp, which they reached about 9 p.m.

A mile farther on the party met the Harvard group carrying Jessie Whitehead. Although almost in a coma, she recognized Joe Dodge.

"Joe," she said to him sternly . . . "give me a drink of milk and get me to a hospital. I'm sick." It was . . . bitterly cold, but Joe got her to the hospital after a grueling three-mile trip down the mountainside. In the process he saved her life. A blood clot broke loose. Dodge snatched up a handful of snow, clapped it on the wound and stopped the hemorrhage. Miss Whitehead subsequently recovered. "I can't understand it," he muses now, "We were rougher than a sonovagun with her—had to be—but she lived."[9,10]

No story of climbing on Mount Washington can be complete without giving credit to the Appalachian Mountain Club and to Joseph Brooks ("Joe") Dodge, for so many years the club's manager at Pinkham Notch Camp, and the sparkplug of so many rescues of lost and injured climbers and skiers.

The A.M.C. was founded in 1876, with Professor E. C. Pickering of the Harvard College Observatory as first president. Through subsequent years the club has wielded a mighty influence in preserving the beauty of the White Mountains through guardianship or ownership of

Ruin of *Among the Clouds* office after fire of 18 June 1908.



Monument to Lizzie Bourne, first woman to perish on Mount Washington.



F. Allen Burt climbing with Warren Hart on Six Husbands Trail on Mount Jefferson October 1910.

several semipublic tracts of forest land in New Hampshire and Massachusetts. It has done more than any other group to promote safe tramping across the big range by building a hut between Mount Madison and Mount Adams, and first a shelter, then a hut, at Lakes of the Clouds, as well as the hut in near-by Carter Notch.

In 1920 the trustees of the club's real estate decided to build in Pinkham Notch two log cabins. Bill Loker of Natick, Massachusetts, was the first hutmaster (1921), with Milton MacGregor as manager of the entire system. In 1922 when Joe Dodge was only twenty-four he was hired by MacGregor as summer manager of the fledgling camp. The road up Porky Gulch, as Joe dubbed the notch when porcupines were plentiful and hikers scarce, was not too good in summer and closed throughout the winter. But Joe loved to hike and to fish; pioneering in this wilderness drew him back each summer, till in 1926 he threw away the key to the camp and made this a full-time job. On 26 October 1927 he married Miss Cherstine Peterson of Cambridge, Massachusetts.

An ever-increasing stream of hikers came to Joe for shelter, counsel, or perhaps just to join in his infectious laughter at his tall tales—tales of spike-tailed Dingmahauls and green-whiskered Cumatabodies passed down for fifty years from one of the most enthusiastic and best-known White Mountain guides, B. B. ("Bick") Bickford of Gorham, New Hampshire. How the stream of hikers and skiers has grown is illustrated by the increase in income of Pinkham Notch Camp from $2500 for the summer of 1922 to an annual gross of about $100,000 today.

One of Joe Dodge's important innovations was the elaborate microwave radio station, connecting the camp with the weather station operated by Harvard College on Blue Hill, Milton, Massachusetts, and with the Mount Washington observatory. A radio ham since 1912, Dodge has, through this radio, made efforts for the rescue of missing and injured persons much more effective. Donald Waugh calls him the "spark plug of the well-oiled, sometimes mysterious mechanism which has made the mountains a safe, comfortable resort of the initiated."[11] In 1958 Joe Dodge decided to retire to a less strenuous life in North Conway, New Hampshire.

11. Skiing

AS a means of winter travel in this country skiing started in a small way as early as 1840, with the newcomers from Norway who settled in the upper peninsula of Michigan. Around 1860, the Reverend John L. Dyer was carrying the mail by ski in Colorado. But only within recent years has skiing become the universal winter sport that has built winter resorts and ski-tows running into millions of dollars of investment.

Of all places in New England where skiers get together, there is none where snow lingers longer, or where everybody from novice to hardened expert may have more fun and thrills, than in Tuckerman Ravine on the eastern flank of Mount Washington. On a sunny Sunday in spring, when snow still lies deep in the ravine and up the headwall, and when the snow field is colorful with scores of happy, lusty skiers, it is hard to realize that skiing as a sport on Mount Washington dates back only fifty years. The first descent by a skier took place on Thursday, 16 February 1905, when Norman Libby of Bridgton, Maine, made the ascent from the Base Station, accompanied by the winter caretaker of the railroad's property, and slid down the mountain on skis.[1]

Mr. Libby, who was assistant editor of *Among the Clouds* for two summers, was not content with being the first man to "slide down Mount Washington," but returned in February 1907, with a friend, intending to climb to the Halfway House for the ski ride down the carriage road.

But at the Glen House the proprietor promptly offered to secure creepers that would make it possible to reach the summit. So, while waiting for the creepers to be sent from Gorham, the two men made

the trip to the Halfway House, wearing skis bound with rope. The road was piled with from three to four feet of snow, and along some parts of it Mr. Libby reported that "the drifts were small mountains." After eating dinner by candlelight in the boarded-up Halfway House, the two men fastened on their skis for the run of four miles to the Glen House, which they made in a running time of twenty minutes.

Next morning they made Halfway without incident. Just above the house, at Cape Horn, where the road makes a sharp U-turn, Mr. Libby reported the snow as making "an unbroken slope from the top of the spur down hundreds of feet to the threatening gulf below. Not even a twig offered a clutch in event of mishap, and, our creepers not yet put on, it was a thrilling moment as we passed this declivity."[2] On their return, just after they crossed this same spot, a large area of their path slipped from the ice beneath the hard snow and shot into the valley, a thousand or more feet below! Around the Horn they found a deer, frozen and blown dead against the rocks.

Their creepers were moccasins split and laced at the toe, with two ankle straps for adjustment outside overshoes. On the sole and heel were pieces of steel, the edges of which were turned down like a cooky-cutter. These gave security on crusted snow, but were of little help on ice.

From a point four and a half miles up, to the fifth milepost, there is another snow slope that is dreaded by winter climbers. It is like the one at Cape Horn, only more frightful. Here, for nearly a half hour, the two men picked their way, step by step, "daring to look neither to the right nor left, for fear of dizziness."

Between the fifth and sixth mileposts was their longest test of endurance. It was a snow-packed road again, on which the creepers made not the slightest dent. Somehow they made their way across, and from there to the summit the mountain was blown free of snow.

It was even before these ascents—back in the 1890s—that there had appeared at Dartmouth College the first crude homemade skis, awkward contraptions that garnered more laughs than followers. A new era began in 1909–10 when Fred H. Harris of Brattleboro, Vermont, the first Dartmouth man who was a really proficient ski runner and jumper, proposed the formation of an outdoor club. Early in January 1910 the Dartmouth Outing Club (or D.O.C.) was organized, with fifty or sixty members. Fred Harris '11 was its first president. On Saturdays a group of snowshoers, led by a few speedy skiers,would hike out over the snowy fields and hills, their odd clothing and clumsy gait

provoking more derision than enthusiasm among the undergraduates. But the seed was sown and sprouted swiftly, and, as one Dartmouth man said, "The college has never fallen so quickly for any other new sport as it did in 1910 for controlled ski running."[3]

As the D.O.C. grew and prospered, the slopes and hills around Hanover became a bit tame. The long finger of Mount Washington was felt, if not seen, beckoning across the snowy heights, and in March 1913 Fred Harris, Joseph Y. Cheney, and Carl E. Shumway, all members of the Club, were skiing at the very top of New England. That the D.O.C. was the first college club to make that ascent by skis was altogether fitting, for now their alma mater owns that summit.

Early ascents by the Dartmouth Outing Club (prior to winter opening of the Pinkham Notch Camps in 1926–27) were made by snowshoe from the Glen House up the Carriage Road, across on the Raymond Path, and into the floor of Tuckerman Ravine. Then began the laborious job of cutting steps in the hard-packed snow to the rim. If conditions on the cone were good, the hike with crampons above timber line was the easiest part of the trip. One of the dangers pointed out by Robert Scott Monahan, leader of these ascents and later one of the leading spirits in the founding of the Mount Washington Observatory, was the fact that by the time the groups were ready to start down the headwall, the slopes were usually frozen. As Bob Monahan explained: "When the afternoon shadow hits the main wall of the ravine, the snow, if it is at all soft, will 'tighten up' suddenly, and make for tricky descents. One stunt was to 'glissade' down the lower slope, but not always with the same technique used by the alpinists!"[4]

In 1923 Charles A. Proctor, professor of Physics at Dartmouth, widely known as the "Granddaddy of American College Skiing," was the moving spirit in the establishment of the Eastern Intercollegiate Ski Union, formed by Dartmouth, New Hampshire University, and McGill University. From this, and from the famous Dartmouth Winter Carnival, which had its beginning in 1911, sprang the still-growing enthusiasm for this great winter sport at most northern colleges.

Two of the most notable of the Dartmouth skiers to visit Mount Washington were John P. Carleton, who commenced skiing on the mountain in 1916, and Charles N. Proctor, son of the professor. Both held numerous championships, and both had competed in the Olympics. With two such skiers as these making frequent visits to the summit of Washington, it could be only a matter of time before the greatest thrill offered by the rugged old mountain would be attempted—

the descent of the Tuckerman headwall, that sheer drop of 1000 feet into the bowl below. Of that event Carleton writes: "So far as I know the rumor is correct that Charley Proctor and I were the first to run the headwall. That was on April 11, 1931."[5]

In the 1924 Olympics, John Carleton, then a Rhodes Scholar at Oxford University, competed as captain of the Oxford-Cambridge Ski Team. Later a practicing attorney in Manchester, New Hampshire, Carleton was the first American ski-internationalist.

In 1928, at St. Moritz, Charley Proctor was the only native-born American on the United States Olympic Ski Team. He had already been Intercollegiate Champion in ski jumping and downhill and slalom racing, and in 1927 he had been All-Round Ski Champion of Canada. During the 1930s he became Winter Recreation Director and purchasing agent for all tourist facilities in Yosemite National Park, California.

That was the time when skiing was becoming a full-time winter interest for White Mountain landlords and winter sports fans. As more and more people learned how to ski, and as snow trains commenced drawing thousands of beginners and advanced skiers to winter playgrounds, overnight facilities were strained to the utmost on week ends. But by Sunday nights the camps and hotels were deserted.

Although the first descent of Mount Washington by skis took place in 1905, five years before the founding of the Dartmouth Outing Club, and although that club has always been a leader among ski enthusiasts, yet it remained for a little group of Harvard students from Boston to start the first club in America devoted solely to downhill skiing. Robert Livermore, Jr., of Boston and Topsfield, of the United States Olympic Ski Team of 1936, Robert S. Balch of Jamaica Plain, and W. Bradford Trafford of Boston, all members of the Harvard class of 1932, were its originators in 1928–29.

About this time a Swiss watchmaker working at the Waltham Watch factory asked permission to join an outing of the Appalachian Mountain Club. It turned out that Otto Eugen Schniebs was an accomplished skier. The three Harvard boys decided that he was just the man they needed to complete a perfect foursome. And thereupon the Stem-Like-Hell Club was formed.

Bob Livermore and his friends like to recall that they "discovered" Otto Schniebs, who soon quit watchmaking for the more exciting job of coaching Dartmouth skiers. Later he became coach of the St. Lawrence University ski team at Canton, New York.

The Stem-Like-Hell Club members were pioneers in more ways than discovering talent. In February 1930 Bob Livermore became the first Harvard man to enter the Dartmouth Winter Carnival. To the surprise of his Dartmouth hosts he won the slalom race and placed second in the downhill race. In 1931 he won the down-mountain race on Moosilauke. During the spring of 1931 the club members spent three or four days in the Camden Cottage, and were the first party of skiers to go down from the summit over the headwall of Tuckerman. This was a week after Charley Proctor had made his "first" run over the headwall from the lip, with John Carleton following.

It was during that winter of 1931 that Balch, Livermore, and Trafford secured permission to represent Harvard in ski events held under the auspices of the Intercollegiate Winter Sports Union. Although not officially recognized, a ski team was active at Harvard beginning with the winter of 1933. Skiing was officially recognized as a minor sport by vote of the Harvard Athletic Association on 5 February 1940.

On 2 January 1932 a heavy snowfall made possible the first thorough testing by skiers of the recently improved Forest Service Trail from Pinkham Notch to Tuckerman Ravine.[6] Its moderate grade and negotiable turns proved its attraction to both expert and novice skiers, and have been of invaluable assistance in getting injured skiers out to Pinkham Notch when emergencies have arisen.

After those exciting days in April 1931, ideas about ski racing in Tuckerman Ravine began to bud in the minds of America's top-ranking skiers. The Nansen Ski Club of Berlin, New Hampshire, the Hochgebirge Ski Club of Boston, and the Deutsche Ski Club of New York, to say nothing of all the college ski clubs and the ski enthusiasts of the Appalachian Mountain Club, turned speculative eyes toward the Tuckerman headwall.

Just under a year later, on Sunday, 20 March 1932, those budding ideas bloomed into the "Mt. Washington Spring Snow Fest," featuring, under the auspices of the Nansen Ski Club, the Glen House, and Joe Dodge, a series of races and jumping events for girls, boys, and senior skiers. The climax of the day's events was the eight-mile race down the Carriage Road, the first ever attempted. Sanctioned by the Eastern Amateur Ski Association, this race attracted Olympic, college, and individual stars from far distances.

In advance publicity describing the race the four miles at the top were spoken of as "the four hardest miles of skiing on the continent. Wind-blown crust, ice, huge drifts as large as ocean waves impede the

progress of skiers. The last four miles, from the Halfway House down, are comparatively easy, and afford some of the best skiing in the country. This [lower] four-mile slope is wide and averages a little over a ten per cent grade." It had been covered by a member of a Dartmouth ski team in 8 minutes, 16 seconds. Up to that time no one had been known to run from the summit against time, but it was expected that nearly forty minutes of terrific strain would be necessary for the eight miles.

The Nansen Ski Club, under whose supervision the race was held, was the pioneer ski club of northeastern United States. The race was promoted by Alf Halversen, a coach of the Olympic Ski Team, and a committee headed by Olaf Nelson, president of the club. Assisting the Nansen Club were Joe Dodge and Bob Monahan from the A.M.C. Huts in Pinkham Notch. The Glen House was represented by Elliott C. Libby, the manager, and C. M. (Charlie) Dudley, ski instructor, and former recreational ski instructor at Dartmouth College.

Of course the eight-mile grind from the summit to the Glen was the feature of the meet. But Mount Washington was in no mood to cooperate with flying skiers. Conditions of snow and weather, including a seventy-mile gale, caused officials to give up hope of staging this event. But the five experts who had entered this hazardous race were not to be turned back by a mere hurricane. Facing death at every turn while traveling at blinding speed in the face of the gale, they completed the first race from the summit to the Glen House in a little over twelve minutes.

Over 6000 persons were waiting at the end of the road to cheer the racers as they whizzed like human bullets down the mountainside, ending the race so closely that the winner, Edward J. Blood of the University of New Hampshire, was only twenty-five seconds ahead of the last man to cross the line.

Although they wore special goggles and helmets to protect them from slashing ice particles whipped up by the wind and their own hurtling speed, their noses and mouths were frostbitten, and tiny particles of ice were imbedded in exposed portions of their faces.

Three members of the 1932 United States Olympic Ski Team took top honors in the Carriage Road race, in this order: E. J. Blood, 12 minutes, 20 seconds; Nils Bachstrom, Swedish Ski Club of New York, 12 minutes, 30 seconds; and Bob Reid, Nansen Ski Club, 12 minutes, 35 seconds.

Asked what it was like to rocket down the mountain at a speed

sometimes in excess of eighty miles an hour with certain death always jogging his elbow, Ed Blood said:

It was like watching a ribbon of white uncoiling beneath me. I could hear a roar in my ears and see a blur of black as I came below the timber line. I could hear a peculiar singing sound as the skis rasped over the snow crystals, and I got the impression of the world flying up to meet me, as if I was falling from an airplane . . . but that's about all, except that we had some mighty close shaves. I never have seen a race so evenly matched. We swung around the turns just as if we were actuated by a single mind, every man in his own place, neither gaining nor losing a yard.[7]

To apprise the spectators and timers below of the start of the race, a gigantic rocket specially prepared for the occasion was discharged at the summit. The simultaneous start in a ski race is rarely possible in this country, but inasmuch as the first half of the race was above tree line, and the road quite open, the competitors had plenty of room to spread out. Mr. Blood's statement indicated that they early found their respective places in the group and held them to the end.

On Easter Sunday, 16 April 1933, the dream of a ski race from the summit of Mount Washington down over the Tuckerman headwall came to reality in the first "American Inferno." So hazardous was the event considered that it was quickly dubbed a "suicide race."

Sponsored by the Ski Club Hochgebirge, whose motto is "Dash and Abandon," with Joe Dodge as chief official, every precaution was taken against accident. Expected times were three minutes from summit to rim of headwall, where runners were to zigzag almost to a dead stop between slalom flags; one minute down the thousand-foot drop of the headwall; then through the tortuous path past Hermit Lake and down the Forest Service Trail, which had been done in three minutes fifty-five seconds.

Of this first Inferno Race, in which fourteen skiers entered, Winston Pote, color photographer, wrote: "The best time was around 17 minutes, by Hollis Phillips, though that was down the 'right' or north gully. It was in a driving rain and very heavy snow and he was the only skier who came down there on his feet."[8]

Records on Mount Washington depend upon many factors which may never be repeated. While the bowl of Tuckerman usually is 200 feet deep in snow in April, in 1933 there was enough more to form the required angle at the upper rim for an expert skier to make a perfect run of the headwall.

This snow always continues skiable into June. But in 1933 Tucker-



Mount Washington from the north across the Great Gulf.



Charles N. Proctor, purchasing agent and winter sports director, Yosemite National Park, who made the first descent



Ski race spectators on Tuckerman headwall. Note skier near top with flying snow from fast turn on this fifty-degree slope.



Down the headwall during Oylmpic tryouts.

man Ravine set up a new record by furnishing skiing on the Fourth of July. Easter week end, however, is likely to be the most popular time of all in Tuckerman. Each year finds a growing host of skiers trekking up the muddy trail from the Pinkham Notch Camp to revel in a sun-blistering paradise of snowy slopes mounting up, up, up, to the pinnacle of all skiers' dreams—the lip of the Tuckerman headwall. Gwendoline Keene gave this picture of Easter week-end skiing, "when Tuckerman's bowl is best":

> Caught between winter's isolation and the summer "goofer" season it is a little world of its own, a pocket warmed by the sun and cooled by the cold that rises from its floor of marble snow, a pendant world where midget skiers come to climb and slide, to climb and slide again, to rest on the warm exposed summits of its few great rocks, to laugh and chatter and hum and hear far-off sounds. . . .
>
> The day's big event may be some one running the headwall. Perhaps it's Charley Proctor, and you watch carefully to see the little speck that appears on the rim and is he. The speck starts, swoops, doubles back, swoops again, zigzagging at ever-widening angles until it dashes breathlessly straight down and stops at the bottom in one last long side-slip of a Christie."[9]

But spring in Tuckerman is not all sun-bathing. Sometimes a blinding blizzard will fill the bowl. Snowslides may add to the excitement, and at times people have been carried along, buried waist deep, and may even have to be dug out of the snow.

Illustrating what terrific and swift changes in the weather are to be encountered on Mount Washington: On a beautifully warm and sunny 17 June 1933, at one o'clock in the afternoon, a sudden cold wind blew an immense black cloud over the headwall of Tuckerman. It spread out on the sides of the ravine and shut down like a curtain at the rim of the bowl, leaving the bowl enclosed like a tremendous tent and lighted by a queer twilight. After a few claps of thunder and ten minutes of severe hail, there followed a driving snowstorm which lasted an hour and deposited about an inch and a half of snow in the ravine before clearing again to bright sunshine. Next day young Simon Joseph of Brookline, Massachusetts, perished on the plateau land near the Lakes of the Clouds in a similar storm.

From 1933 to 1939, weather and snow conditions permitting, an Inferno Race was run on skis from the summit of Washington down the cone, over the headwall, and out the Forest Service Trail to Pinkham. In the Inferno of 1934 the Stem-Like-Hell Club again made history. All the contestants went to the summit. During the time they

were climbing up there was an avalanche on the face of the headwall, but none of the skiers knew about it. Bob Livermore was one of the first over the lip, going over far to the left of the summer trail, and turning sharply to the right under the overhanging crag. As he did so, he discovered that there had been an avalanche, and realized that he was running directly into the path it had left, which meant disaster. Turning abruptly to the left he attempted to schuss straight for the foot of the headwall. But near the bottom he ran head-on into the debris left by the avalanche. His skis were snagged, and he was thrown into the air with terrific force.

In those days skis were fastened securely with straps. There were no safety bindings to free the feet in case of accident. Where the skis went the skier went also. And in this case Bob went into the air; turned a perfect triple somersault—somebody caught a movie of the dramatic event—and landed with unbroken skis to go on and finish the race, then to find that in his landing he had sprained both ankles!

Perhaps the most remarkable performance of all was the schussing of Tuckerman headwall by Toni Matt, who afterwards served as head instructor of the Sun Valley Ski School, and later conducted his own ski school at Whitefish, Montana—one of the most brilliant skiers of all time. Born at St. Anton-am-Arlberg, birthplace of the renowned Hannes Schneider and his famous ski school, Toni strapped on his first barrel staves so early in life that at six he won his first race. At fourteen he was a full-fledged instructor in Schneider's school. For five years he taught at St. Anton, also taking part in most of the big Continental events.

Chosen by Schneider, in 1938, to assist the "Skimeister" in operating his school at North Conway, New Hampshire, and knowing almost no English, Toni Matt began teaching there through the medium of sign language. In the late winter of 1939, while only nineteen, he began to blaze a trail of ski victories that carried him through to practically every major downhill and slalom title in the United States. In that first season of American competition, he won the Eastern Combined at Stowe, Vermont, the Harriman Downhill at Sun Valley, the National Open Downhill at Mount Hood, and the Gibson Trophy at North Conway. This he won five times, retiring one cup and possessing two legs on another. But of all Toni's victories, the most remarkable was in the April 1939 Inferno, when along the race course a shout went up that was echoed throughout the entire skiing world: "Toni Matt schussed the headwall!"

Even in a race, the headwall is generally handled in a series of turns. But Toni was not in a conservative mood that spring day, and his line was as straight as a die. "Uncorking one of the greatest schusses in all of skiing history, he took the Headwall in one long dive that left the 4000 spectators literally gasping for breath. Shooting across the outrun at sixty miles an hour, he roared over the Little Headwall and down the Sherburn Trail at full throttle to record a stunning 6:29.4 mark . . . a full minute better than that of second place winner Dick Durrance."[10]

Winston Pote adds a word to one of the most spectacular records ever made on Mount Washington: "There is no doubt that Toni Matt made the first real 'Schuss' down the headwall, from practically the top, and I dare say the last! Just like the airplane landings, the elements were kind and snow was favorable. He came over the top very near where I was standing, and made only one turn, some 75 feet below, then straight down! He said afterwards, 'I intended to make two checks, but the snow felt so good I pointed them down!' He had run the cone almost straight, and that was wind-blown. So this unusually deep powder on the headwall must have seemed good."[11]

How swiftly skiers can run into difficulties in Tuckerman Ravine is illustrated by what happened on 19 April 1947, when more than 350 ski racers and spectators were gathered high up in the Ravine for the annual Harvard-Dartmouth slalom race. Suddenly, a ski patrolman, investigating snow conditions above the race course, touched off an avalanche which plunged 450 yards down the steep racing stretch known as "Hillman's Highway" just after the race had started.

Brooks Dodge, son of Joe Dodge and then the seventeen-year-old Eastern Downhill champion, was halfway down the course when the slide started. He immediately let his skis run straight for the bottom, and outran the avalanche.

Since then ski safety has been promoted by the Mount Washington Ski Patrol, a small volunteer group who give their services to forewarn skiers of dangerous conditions. Also for the past few years an intensive study of avalanches, their causes, and methods of "touching them off" to avert danger has been going on at the Avalanche School of the Forest Service at Alta, Utah. Their techniques are helping rangers of the U. S. Forest Service and ski patrolmen to promote safety for skiers in Tuckerman.

But avalanches cannot stem the enthusiasm of Mount Washington skiers. The sport is a part of them—is in their very blood—and must

be served. So year after year they come back to the rugged old mountain and to its most popular ski slope—Tuckerman Ravine. And each one, whether novice or hardy professional, sings in his own words and in his individual rhythm Wilson MacDonald's "Song of the Ski":

I poise on the hill and wave adieu;
(My curving skis are firm and true)
The slim wood quickens, the air takes fire
And sings to me like a gypsy's lyre.
Swifter and swifter grows my flight:
The dark pines ease the unending white.
The lean, cold birches, as I go by,
Are like blurred etchings against the sky.
One am I for a moment's joy
With the falling star and the plunging bird.
The world is swift as an Arab boy;
The world is sweet as a woman's word.
Never came such pure delight
To a bacchanal or a sybarite:
Swifter and swifter grows my flight,
And glad am I, as I near the leap,
That the snow is fresh and the banks are deep.[12]

12. Breaking Records

DURING the past century there have taken place a series of record-making events that have added many a thrill, and often a laugh, to the history of Mount Washington.

A. S. Walker of Boston climbed the old Glen Path to the summit barefooted 27 July 1855. George S. Dana, another Bostonian, counted his steps from the Glen to the top of the mountain, a total of 16,925, on 2 August 1857. John Irving of New York made a record ascent from the Glen in August 1855 in one hour and fifty-seven minutes. But the prize seems to go to a lady by the name of Branch who, on 25 July 1855, walked from the Glen to the Tiptop House and back in the same day on a bet of $1000. She also danced at the Glen House in the evening. History states that she boasted the heroic weight of 230 pounds, and is described by Spaulding as being "the heaviest lady that ever visited Tiptop."[1]

One of the most picturesque characters who ever attempted a record run down the Mount Washington carriage road was Edgar Welch, of Hiram, Maine. During the years 1900–07, he came each year to make the run. He was tall, raw-boned, with a stubbly beard and thin, reddish hair. Dressed in a rusty old black suit and a rough black-and-white striped shirt, he sported on his head a tall, light-gray beaver hat, a relic of a former era. His already considerable height—he was over six feet tall—became almost gigantic when supplemented by this massive hat.

Mr. Welch spent some hours on the mountain before attempting his record run. Employees of the Summit House and of the printing office of *Among the Clouds* offered to train him for the event; an offer accepted the more readily because the training consisted mainly of visits to a certain back room in the Summit House.

This room carried a subtly inviting aroma, suggestive of the wine jelly for which the Summit House dining room was famous. It was a room which under New Hampshire laws was supposed not to exist, but which was, nevertheless, a haven of refuge for many a weary traveler. Mr. Welch was not weary, but he had a wonderful capacity for "training." After a few visits "out back" he was as restive as a doped race horse, and he developed a knee action that outrivaled the famous German goose step.

There followed considerable preliminary warming-up on the platform in front of the Summit House, with Editor Bob Dunham of *Among the Clouds* acting as trainer and coach. Finally Jimmie Powers, for years head bellboy and porter at the Summit House, gave the word, snapped his stop watch, and the race against time was on. With the cheers of the summit colony ringing in his ears, with the "cheer" of the Summit House "stock" singing in his veins, with long arms flailing the wind, and tall beaver hat still clinging to his great head, Edgar Welch was off down the carriage road. His record, made when he was fifty-one years old, of somewhere near three-quarters of an hour for the eight miles (27 minutes for the 4.4 miles to the Halfway House) was lowered later to forty-two minutes by George Sanford Foster, of Manchester, New Hampshire, while a medical student at Tufts College. But surely, nobody else has ever run down Mount Washington wearing a plug hat!

But running down Mount Washington was not sporting enough for Harlan P. Amen, renowned principal of Phillips Exeter Academy, so he ran *up* the carriage road in 1875 in one hour and fifty-seven minutes. This record stood until 1904, when George Foster repeated the eight-mile scramble in one hour and forty-two minutes.[2] Foster had been an outstanding athlete at Manchester High School and physical director at the Manchester Young Men's Christian Association, and later at the Concord, New Hampshire, Y.M.C.A. On the first of August he had joined a boys' group known as the Next-to-Nature Camp, spending the month at the Toll House at the foot of the carriage road.

For two weeks Foster conditioned himself by running on the hilly roads in Pinkham Notch. On the morning of 16 August a large crowd gathered at ten o'clock to watch George start for the summit. At the seven-mile mark he passed a carriage that had left the Glen at half past seven, but, with an eighty-mile-an-hour wind blowing on the open cone, his progress was extremely difficult. During the next thirty years several attempts were made to lower Dr. Foster's record, but without success.

In 1936 Foster organized a group of trained marathon runners to attempt to break his record up the mountain. The run attracted sixteen of the best distance runners of New England. It was organized and carried out under the auspices of the New England Association of the Amateur Athletic Union. On 8 August Francis Darrah of Manchester, a member of the Norfolk Club, won the race in the record time of one hour and fifteen minutes and forty-eight seconds.

In the following year sports enthusiasts decided to make the Mount Washington road race an annual event. Newspapers pledged their support. Dr. Foster donated a sterling silver cup as a permanent trophy to be engraved each year with the name of the winner; and the executive committee contributed five smaller cups for the runners who finished in the first five places. The Mount Washington Run Associates of New Hampshire, with Dr. Foster as chairman, was formed to sponsor the race, which was scheduled among the summer events of the New England A.A.U.

On 14 August 1937, the Second Annual Mount Washington Road Race was won by Paul Donato, Roxbury Boys' Club of Boston, in one hour, sixteen minutes, twenty-four and four-fifths seconds.

Official starter for the 1937 run was George V. Brown, then vice-president and general manager of the Boston Garden Arena Corporation, and for thirty years starter of the Boston Athletic Association Marathon in Massachusetts. To record the event, Boston Radio Station WBZ of the National Broadcasting Company made the first complete broadcast from the summit of Mount Washington. It was broadcast by means of short wave from the Weather Observatory on the mountain to the Blue Hill Observatory in Milton, Massachusetts. From there it was fed by wire to the WBZ control room, where it was broadcast to New England. The event was also covered for the newsreels. These pictures were shown in over 30,000 motion picture theaters in the United States and Canada.

Trophy cups were awarded to the winners at a banquet held that evening at the Mount Washington Club on the summit, where all connected with the event gathered as guests of Colonel Henry N. Teague, president of the cog railway.

Just a year later, in the Third Mount Washington Run, Francis Darrah won for a second time, with a new record of one hour, fifteen minutes and one second.

But most Mount Washington records are not scheduled, nor yet competitive. When Carl Weiss of New York climbed from the Base Station to the summit via the Jewell trail in five hours, including a

stop for lunch, it was a real record. For Mr. Weiss was blind, and was led by a Seeing-Eye dog. He was probably the first blind man to make his way to the Top of New England without human companion.

Equally daring was R. E. Welch, one-legged station agent of the Boston & Maine railroad at Northumberland, New Hampshire. He had always wanted to climb Mount Washington, but it was not until he was thirty-eight, and walking with one leg and a crutch, that, on 6 August 1932, he realized that dream, making the difficult ascent by way of the trackside of the cog railway. He not only accomplished this unusual feat, but he bettered the average time of four hours for a normal man, cutting the actual climbing time to three hours and eleven minutes.

Why anybody ever wanted to push a bicycle up Mount Washington is a mystery. Yet *Among the Clouds* records several such exploits. On 16 July 1883 E. H. Corson, of Rochester, New Hampshire, wheeled up the carriage road a Star bicycle, a vehicle on which the rider was perched high above the ground over a large wheel, with a little wheel in back for balance. He rode back to the Glen in one hour and thirty minutes, using an ordinary hand brake. Corson said the machine weighed eighty-five pounds and that he had at least fifteen pounds of baggage on the handle bar, but he was able to keep the machine under control with the hand brake. However, when he reached the Glen, he said, "my right arm hung limp and lifeless. The prolonged strain of holding the brake had absolutely deprived it of sensation and power of motion. . . . It was a long time before my arm recovered its use."[3]

On 1 August 1883 H. D. Corey of Brookline, Massachusetts, sent his bike up by stage, and made the down-mountain ride in one hour and twenty minutes, a new record. But only ten days later C. E. Heath of Chicopee, Massachusetts, made the run with a ninety-pound Victor tricycle in fifty-five minutes.

With the development of the "safety" bicycle, a number of wheelmen came from time to time to coast down the road, and at least one woman accompanied her husband on a separate machine. Usually the bicycles dragged a plank behind them for safety, but at least one descent was made by A. B. Stearns on a wheel fitted with a Morrow coaster brake.

In 1892 three young men who were wheeling through the mountains, through some misunderstanding as to the nature of the path, started up from the Crawford House at 9:30 a.m. pushing their bicycles before them. It was 7 p.m. before they reached the foot of the cone



Edgar Welch of Hiram, Maine, starting his annual run down Mount Washington wearing ancient beaver hat. Jimmie Powers, porter at Summit House, holds stop watch (about 1900).



Charles Ellery O'Hara, famous Glen House driver, ready for start of his record-breaking drive up the carriage road on 6 September 1887.



Mr. and Mrs. Freelan O. Stanley in their steam Locomobile make the first ascent of Mount Washington by auto 30 August 1899.



First Climb to the Clouds 11 and 12 July 1904, the Peerless at the finish line just below the old stable. At far right is Francis E. Stanley, twin brother of F. O.

of Mount Washington, where they left their wheels, and at 8 p.m. they reached the top thoroughly exhausted. Next morning they brought their bikes to the summit and coasted down the road. Early in the century a young man from Maine reversed this procedure by pushing his bicycle up the road and then down the Crawford Bridle Path.

Bicycle riding on Mount Washington appeared to have gone its limit when, on 27 July 1905, a new chapter was added. Two youths from Portland, Maine, had left their home city Wednesday morning, the twenty-sixth, and made the seventy-four miles to Jackson the same day. They were on their way to New York City via the Connecticut valley, and were misled into making the ascent of the mountain by a faulty road map which showed a road parallel to the railroad, which seemed to offer an easy descent to the west of the Presidential Range. Also, at the entrance to the Tuckerman Ravine trail they found a sign reading: "Mount Washington, 3.6 miles." Surely, this was better than going eleven miles around by the Glen and the carriage road, so up the path they started. Climbing the headwall took about all their energy, but the cone with its myriad rocks was even more difficult. A thick fog made matters worse, and it was with no little relief that they reached the summit. Next morning they returned to the Glen by the carriage road.

A diverse stunt, though rather easily accomplished physically, was that of Gardner E. Campbell, managing editor of the Wakefield, Massachusetts, *Daily Item*, whose hobbies, since about 1912, had been mountain climbing in the White Mountains, and associated picture taking. He was fifty-one at the time of his exploit of 17 July 1937, scaling Mount Washington in four ways in one day.

Accompanied by his son, Gardner, Jr., aged sixteen, and Malcolm Brown, seventeen, also of Wakefield, Mr. Campbell left the Pinkham Notch Camp at 4:15 a.m., and arrived at the summit via Tuckerman Ravine at 7:35. At eight the party started down the road, turning off at the Nelson Crag trail to shorten the distance to the Glen House.

There Mrs. Campbell met the trio with their car, and accompanied them up the mountain at about 10:30. In the last mile the clouds were so dense that the two boys lay on the front fenders and shouted warnings or directions. The party was back at the Glen at 12:30.

After lunch they drove down Pinkham Notch and up Crawford Notch, where they were delayed by a blinding shower, but reached the flying field at Twin Mountain at 2:30. There a pilot was waiting with a small two-seated plane. In thirty-five minutes they had crossed the

Presidential Range at Mount Madison, swung over Pinkham Notch, and recrossed over Mount Washington, coming as near the summit as the pilot dared, and were back at Twin Mountain in time to drive to the Base Station and catch the 4:15 train up the mountain, thus completing four different ascents in one day.[4]

One of the happiest little misses who ever climbed Mount Washington—and doubtless the youngest—was little Virginia Reynolds, aged five years, of Knoxville, Tennessee. On 28 August 1926 she trotted up the Tuckerman Trail in six hours and returned in four, keeping ahead of her mother, her grandmother, and a brand new step-grandfather. The little girl ate raisins on the way up, and at the Summit House ordered a steak—but settled for fish chowder.

A woman climber who deserves more than passing note is Miss Lilla M. Newhall, of Wakefield, Massachusetts, who at the age of seventy-two made her sixty-sixth ascent of Mount Washington on foot. She had usually climbed alone, most often by the Crawford bridle path, and had spent many hours collecting flowers and plants from the Alpine zone.

For perhaps fifty years nobody tried to scale Mount Washington on horseback. But on 1 September 1932 four members of the Littleton (New Hampshire) Riding Club negotiated the nine-mile trail from Crawford Notch—over which in 1840 Abel Crawford rode the first horse to the summit—in slightly less than six hours. And on 25 July 1933 Miss Lillian H. Judd of Waterbury, Connecticut, rode Big Boy from Jackson to the Glen House, where she stopped for lunch, and then up the auto road to the summit in three hours.

There are few tales of fast drives up the carriage road. But back in the eighties there were four such records. The first was on 22 August 1882, when James W. Brown, for many years a Glen House driver, drove a six-horse mountain-wagon with H. McK. Twombly, William D. Sloane, and party up the mountain in two hours and three minutes.

On 8 August 1883 Brown cut his time to one hour, seventeen minutes, when driving for Jacob Vanderbilt, brother of the "Commodore," and William Turnbull. A year later, on 10 September, this record was lowered by seven and one half minutes by "Ken" Eastman, with E. V. R. Thayer of Boston as passenger.

But the final record of this sort ended with the arrest of the driver and an end being put to all further attempts. It was on 6 September 1887 that Charles Ellery O'Hara, famous driver of Glen House stages, made the final record of one hour, nine minutes and twenty-seven

seconds, driving a two-seater open carriage with six horses. Dr. W. Seward Webb, son-in-law of William H. Vanderbilt, engineered the feat. They were accompanied by Major and Mrs. W. Boerum Wetmore of New York. There seems to have been some family rivalry mixed up in the event, for Mrs. Webb was a grandniece of Jacob Vanderbilt.

O'Hara and Webb were indicted for cruelty to animals. O'Hara was arrested and held after a hearing, but was never tried. In fairness to the driver it should be added that the horses were given the best of care and none showed any injury or ill effects from the trip.

That summer of 1887 C. B. Raymond, still remembered by the Raymond Path in Tuckerman Ravine, with his wife and daughter, spent five weeks at the summit, during which time he repainted the Tuckerman Trail from the summit to the headwall. It is of personal interest to me that, during the summer of 1877, my father and a companion were the first to "spot" this trail with paint.

On the more romantic side of Mount Washington life, several couples have set up claims of being the first to be married on the rocky old summit. But this distinction now appears to stem from 1877, when the Bridgton (Maine) *News* carried this marriage notice:

> On Mount Washington, June 2d, by H. B. Abercrombie, Albert Farrington, of Lowell, Mass., formerly of Lovell, Me., and Mrs. Frances Cogan of Freyburg (widow of the late Ralph Cogan).[5]

But the most exciting and spectacular records set up on Mount Washington have been those made by drivers of automobiles, some of them professional racers, some amateurs, every one of whom has added something to the popularity of the trail blazed in 1899 by a little horseless steam "buggy," in the first auto ascent of Mount Washington.

It was early in the afternoon of Wednesday, 30 August of that year, that a farmer on the Jackson road was seen hurrying across his dooryard to the cottage of a summer neighbor, in great excitement, shouting: "Say, what do you s'pose? Just now I was settin' on my front door rock and I looked up the road and saw a buggy with a man and a woman in it coming down the hill. But I couldn't see no hoss. And when they got down here to the bridge, BY GORRY, TH' WAN'T NO HOSS! They went slippin' along down past the house just as slick. The man was steering the thing with a kind of a crooked broom handle, and they was out of sight over in the Pinkham Notch road in no time."[6]

On that quiet summer day that strange new vehicle glided into the Glen along the way that sixty-eight years before saw the coming of

Dolly Copp's bridal "car," and paused for the night at the Darby Field Cottage. The occupants of that horseless buggy were Freelan O. Stanley and his wife, Mrs. Flora Tileston Stanley. They had driven the 197 miles from their home in Newton, Massachusetts, to the Glen in a leisurely five days, averaging 14.1 miles an hour. This figure was remarkable, considering the primitive roads of that period, many miles of which were deep in sand.

This little steam Locomobile was the invention, in 1896, of Mr. Stanley and his twin brother, Francis E. Stanley. The company was sold in two or three years to the Locomobile Company of America, after which the inventive Stanleys perfected the Stanley Steamer, famous in 1906 for the fastest mile record (up to that time) in the world at Ormond Beach, Florida—a mile in 28.2 seconds and 2 miles in 59.75 seconds.

On Thursday morning, a perfect day, the staffs of the Summit House and the printing office were waiting at the end of the Summit House platform to catch the first glimpse of the pioneer autoists. At last the stage-line agent brought word that the car had passed the Halfway House. At 11 the morning train added fifty more persons to crowd every vantage point. One of the men hurried out to Point Lookout. He looked anxiously over its rim of rough boulders, and turned to wave excitedly to the group above.

"Here they come!" went up the cry all along the summit.

Silently around the bend of the road that skirts the Great Gulf came the little horseless buggy, the red daredevil, the pioneer automobile to "climb to the clouds." Grasping the tiller of the little car was Freelan Stanley, tall, middle-aged, and sandy-bearded. At his side sat Mrs. Stanley, smiling delightedly at the unusual experience, as at 11:35 a.m. they stopped in front of the old stable.

They had traversed the eight miles from the Glen House in the unheard-of running time of two hours and ten minutes. Frequent stops for water ran up the total elapsed time to more than an additional hour. They made the Halfway House in an hour and a quarter.

At the summit the Stanleys were greeted by my father, their friend and Newton neighbor, who took for *Among the Clouds* the only photograph of the historic event. One comment on the climb by Mr. Stanley adds an unintentionally humorous touch: "As the carriage is constructed for road use we found it necessary in climbing the mountain, where the average grade for eight miles is approximately 12 per cent, to jack up the rear wheels and run the engine for a few minutes in order to supply sufficient water to the boiler."[7]

While enthusiastic enough over Stanley's feat to write, "A new epoch of mountain travel begins from the present day," the editor of *Among the Clouds* nevertheless added this conservative forecast: "Compared with the great mass of tourists, those who will come by auto will be necessarily limited in number, but they will form an ever increasing factor in White Mountain travel."

Forty years later the editor admitted the inadequacy of his forecast and the wisdom of the words of our old-time New England sage, Josh Billings: "Don't never profesy onless ye kno!"

Father also quoted the following verse, which he ascribed to the "Office Cat":

> Up thy steep sides, O Agiochook,
> The automobile its winding way took.
> F. O. Stanley was its guide,
> With Mrs. Stanley at his side.
> Cried the horse, "My occupation's gone,"
> While the eagle screamed, "On, Stanley, on!"

Mr. Stanley's feat attracted such attention that news of it was cabled across the Atlantic and printed in that night's Paris edition of the New York *Herald*.

Next summer came the second ascent by a Stanley Locomobile, this one driven by Joseph W. Crowell, a Massachusetts Institute of Technology student and Newton neighbor of the Stanleys, who made the ascent with his mother. It was not until 25 August 1903 that J. L. Phelps made an officially timed auto ascent in one hour and forty-six minutes.

In 1904 occurred the most spectacular of Mount Washington sporting events, and the most grueling hill-climbing contest yet attempted in the East.[8] July 11 and 12 were the dates of the first "Climb to the Clouds." Just prior to this, on 17 June, Otto Nestman, in a Stevens-Duryea seven-horsepower car, made a new record of 48 minutes, 30 seconds.

As the race started on 11 July, A. E. Morrison dashed to the summit in 36 minutes, 44.2 seconds. Then Francis E. Stanley reached the summit in a six-horsepower Stanley Steamer, successor to the Locomobile, in 28 minutes, 19.4 seconds.

That record held for one day. On 12 July Harry Harkness of New York, in a sixty-horsepower Mercedes, stripped to one seat on the chassis, cut the record to 24 minutes, 37.6 seconds, almost four minutes faster than the six-horsepower Stanley.

On Monday, 17 July 1905, was held the second Climb to the Clouds.[9] It is interesting to note how few of the cars then competing are still manufactured. A one-cylinder six-horsepower Olds won the $650 class in 56 minutes, 10.4 seconds. In the class of cars costing from $650 to $1000, Burt Holland in a ten-horsepower Stanley Steamer won the event in 31 minutes, 6.8 seconds, over both the Crawford and Marion cars. The next class, up to $2000, included a Reo, a Maxwell, and an Electric Vehicle Company's gasoline car. In the final class cars costing from $3000 to $4500, were entered a Pope, a Pierce Arrow, a White Steamer, and a Columbia. The Stanley held the record for the day.

Webb Jay led off in the fourth event with the White Steamer to finish in 39 minutes and 1 second. Next, the Napier, in the hands of W. M. Hilliard, was off at a record speed. The excitement reached its height when he tore across the line in 20 minutes, 58.4 seconds. This lowered Harry Harkness's record by 3 minutes, 41.2 seconds. It was all the more remarkable because Hilliard had to stop once to replace a broken battery wire. Twenty-six-year-old Bill Hilliard of Boston was an exceptionally careful driver, and kept the car in low speed all the way from start to finish.

Three world records for motorcycles were set up by Indian motorcycles, the best being made by F. T. Kellogg in 20 minutes, 59.2 seconds.

In the afternoon, Burt Holland, in the Stanley Steamer, made a spectacular finish, passing a Pope-Toledo by running up on the rocks, and going on at a terrific speed, "bouncing like a rubber ball," and earning second place in 22 minutes, 17.6 seconds.

These records stood till the summer of 1923, when Ralph Mulford, famous racing driver, in a stock Chandler touring car of standard gear ratio, made the climb in 17 minutes flat.

Mount Washington automobile records change slowly. It was on 31 July 1928 that Abbott ("Ab") Jenkins, in a Studebaker, made the difficult ascent in 14 minutes and 23 seconds. On 5 July 1932 this record was smashed by "Cannonball" Baker, who drove an eight-cylinder Graham (made by Robert C. Graham of Detroit) cabriolet roadster, equipped in the rear with Firestone dirigible tires, to the summit in 13 minutes, 26 seconds. His average speed was 36.1 miles an hour. His record run was described as "spectacular in the extreme." Baker was not a newcomer to the Mount Washington Summit Road. On 21 September 1928 he had made the ascent in 14 minutes, 49.6 sec-

onds, with a Franklin Special. In September 1932 W. Seward Webb II of New York City set the amateur record of 15 minutes and 58 seconds.

In June 1933 came other records: An Essex Terraplane Eight set a new stock car record of 13 minutes, 33 seconds, and the same afternoon did the impossible by ascending the grade in high gear for the first time in the history of the road. The driver was Chet Miller, one of the most daring of automobile drivers. His teammate, Al Miller, the day before drove a Terraplane Six to the summit in 13 minutes, 58.9 seconds, also a record.[10]

A year later, on 2 July, Al Miller made more automobile history by driving a 1934 completely equipped Hudson stock car up the tortuous road in 13 minutes, 20.6 seconds.[11]

The Mount Washington climb demands high power acceleration, sure braking, and positive traction. In addition to the average grade of twelve per cent (twenty-six per cent maximum), there are ninety-nine curves, more than twelve to a mile, some less than fifty yards apart. Around some of the curves the Hudson was driven at a rate of forty miles an hour, and the driver was at all times in danger of a skid. The time and test trials of the car were said to be equal to 20,000 miles of ordinary driving. Miller covered the lower half of the climb in record time, maintaining an average speed of forty miles an hour, despite stiff grades and turns.

Among the most important factors in the faster driving up Mount Washington were the widening of the road and the removal of some of the 350 water bars ("thank-ye-ma'ams"). However, water bars cannot be eliminated entirely, because surface water must be carried across the road and disposed of rather than being permitted to gully out the road or freeze upon it.

When the road was constructed almost a century ago, it was built by ox carts, and man power.Then later came horsepower in the maintenance work. It was thought that the work couldn't be done by machines, until along came World War II. Manpower dwindled; machines took the place of men and horses; and the final transition was made.

When E. Libby & Sons commenced using autos as stages up the mountain, only big Pierce Arrow touring cars, with the tops down, were used. When Maurice J. Staples, one of the Libby sons-in-law, took over the managership of the Glen House and road, he proposed using Ford station wagons. This was scoffed at because "folks all wanted to ride with no tops in the way." However, he was permitted to try out one of the "newfangled" cars. It proved so popular and so

much less expensive to operate that soon he had installed a fleet of seven Fords and one Mercury, which often make between them a total of fifty trips a day. Besides, as many as 165 private cars visit the summit in a summer day.

Like all the cars that climb Mount Washington the stages are liable to overheating. To overcome this, six-bladed fans are installed. On the trip up the cars are run in first and second speeds. For extra safety on the trip down only first speed is used.

More records were set from 1935 on. On 14 July, driving a Ford V–8 racing bullet through two miles of fog and cloud so thick it could almost be shoveled, John C. Rueter of Cambridge, Massachusetts, shattered all previous records in the remarkable time of 12 minutes, 59.2 seconds.[12]

In July 1938 Lemuel R. Ladd of Brookline, Massachusetts, a slim, mild-mannered young man who had had his own repair shop for foreign-made motor cars, and who for several years had been racing midget cars, came off with top honors in the "Unlimited Class." In his Ford V–8 Special he made the run in 12 minutes, 17.6 seconds, setting a new record.

Then, on 24 August 1940, driving a Ford V–8 Special in the sixth annual Climb to the Clouds, Ladd roared to the summit in 12 minutes and 34.4 seconds in the face of a howling wind that reached a velocity of seventy-five miles per hour at times.[13]

The most severe weather conditions in the history of this unusual event faced the competitors that day as low-hanging clouds shrouded the mountain, and snow flurries and sub-freezing temperatures were encountered. The summit thermometer stood at twenty-six degrees.

All records were once more smashed in the first Climb to the Clouds since World War II, on 16 August 1953, when Sherwood Johnston of Boston and Fort Worth, Texas, twenty-five-year-old sportsman, sped his Jaguar sports car up Mount Washington to victory in 10 minutes, 46.6 seconds.[14]

A year later, on 15 August 1954, the same Johnston, now registering from Rye, New York, smashed his own record by driving a C-type Jaguar, stripped to chassis and engine, up the tortuous eight-mile course in 10 minutes, 44.8 seconds.

Reviving the first Glidden Tour of 1905 and the first Climb to the Clouds of 1904, some 110 ancient automobiles, carrying 250 adventuresome drivers and passengers, rolled out of Hartford, Connecticut, on the morning of 28 September 1947, on a 500-mile tour of New Eng-

land. It would carry eleven of the pre-World War I cars to the summit of Mount Washington in this first gathering of antique motor cars since the time when New England was a center of the automotive industry. Conducted by the Veteran Motor Car Club of America, the tour brought together auto hobbyists from as far west as Minnesota, in vehicles dating back to 1902.

How the newspapers hailed the tour and how their views contrasted with those expressed in 1905 is highlighted by this editorial from the Manchester, New Hampshire, *Union*:

> Now it so happens that the Glidden Tour visited New England once before. Cars then you may remember, were not highly esteemed. Indeed the old *Union* viewed the proceedings dimly. In 1905, it editorialized: "The whole thing is an unmitigated nuisance. The lives and property of perfectly helpless people have been menaced for no reason than to provide amusement for total strangers. Automobiles are a good thing; some drivers can be trusted, most cannot. Take the record of their run from Concord to Manchester 18 miles in 40 minutes. Have they any right to do such a thing? If these people think of coming up another year, let 'em stay in jail a couple of days and everyone will be the better for it." Well, times do change. Automobiles today would be foolproof if it weren't for fool drivers. Some drivers still "cannot be trusted." But that doesn't describe those behind the wheels and tillers of the ancient cars that will make up the 1947 Glidden Tour. Thrice Welcome, Glidden Tourers! And come again![15]

The crowning event of the Tour was the Climb to the Clouds on 20 September when "eleven ancient snorting cars, the youngest 28 years old, labored up 6288-foot Mount Washington."[16]

Jerry Duryea of Longmeadow, Massachusetts, son of the designer of the famous old Stevens-Duryea automobile, made the best time with a 1919 Pierce Arrow in which he wheeled up the mountain in exactly 25 minutes and 30 seconds. Only the best of cars are able to do it in under 20 minutes, making Mr. Duryea's record the more remarkable.

The slowest time up the mountain was made by W. Nelson Bump of Cambridge, Massachusetts. His 1911 Fiat racer was geared to go very fast in high and very slow in low. It took one hour and 32 minutes to make the climb.

A prize for the nearest prediction of his actual time was awarded to Roderick M. Blood of Newton Centre, Massachusetts. He guessed 72 minutes for his 1914 Packard, and made the run in one hour and eleven minutes. By a lucky coincidence, when the Tourers stopped

for dinner at the Crawford House that evening, the manager had dug up a medal of the original "First National Auto Hill Climb, Climb to the Clouds, Held July 11–16, 1904." This he presented to Mr. Blood.

13. To the Summit by Dog Sled

MARCH 30, 1926, saw an event on Mount Washington so hazardous that it had been declared impossible. For on that day the dog Chinook led a team of Arthur T. Walden's Alaskan huskies up the eight miles of winding, snow-packed, and icy Auto Road to the summit. What they learned of ice and hurricane must have stood them in good stead years later when Chinook led Walden's dogs out over the glittering ice packs of Antarctica for Admiral Byrd. But they never faced greater peril than on the frozen flank of New England's highest peak.

Perhaps it was W. A. Macdonald of the old *Boston Evening Transcript* who suggested the expedition. At any rate, it gave him one of his most thrilling stories of adventure in the White Mountains, and it nearly cost him his life. Five years before that, Walden had discussed the trip with many Mount Washington old timers, but only Ray Evans, proprietor of the Willis House in Gorham, who had guided parties over the mountains in all sorts of weather, called the idea feasible.

Arthur Walden, Jake Coolidge of Pathé, and Bill Macdonald mapped out the plan, the trip to be undertaken the end of February. The chief danger was on the side slope above the Halfway House, where the snow melts and freezes into glare ice, which is always blown clear of snow. There the dogs could not keep their feet. Conditions had to be right or the attempt would fail. But that winter the ice was the worst in years. So it was after the middle of March before Walden was notified that the weather was suitable.

Sunday afternoon Walden drove Macdonald to the Glen House by dog sled. There they were joined by Coolidge and Ludwig Geiskop,

both of Pathé News, Arnold Belcher, Boston photographer, Joe Dodge, Ray Evans, and Harold Mohn of Lynn, a skier. At two o'clock Monday morning they set out for the Halfway House, the dog team trotting ahead faster than any man could travel—except Walden. Fifty-five years old and tireless, he trotted behind, holding the handlebars seemingly without fatigue.

At the Halfway House it was zero, with a seventy-five mile wind that nearly blew the dog team off the mountain when they attempted to go around the Horn just above the house. So they turned back to the Glen House, and waited till seven Tuesday morning, when the wind had abated somewhat and the thermometer was up to twenty-four degrees as they started for the Halfway House. Again the ice at the Horn was bad, but with a tremendous effort Walden held the sled upward on its upper runner, and it went across.

There were other places nearly as bad. Yet time and again Ludwig Geiskop and Arnold Belcher climbed walls of ice above the dogs, and Ludwig with his little hand movie camera and Belcher with a newspaper camera gunned the team coming and going. How they reached some of these places . . . is . . . hard to say. For this was lung-bursting, heart-breaking climbing when legs were hard to lift and lungs hard to supply with oxygen. . . . Besides, . . . these two men were equipped only with toy ice creepers bought in a city store and hardly better than worthless.[1]

The party fought their way along to the lower spur of Chandler Ridge. With no stone wall to protect them, they found the icy sideslope nearly perpendicular. It was a full quarter of a mile down that wall of ice. Across it they started, Walden ahead with Chinook, Evans holding the sled. Now it was colder, and the wind had risen to a fifty-to-sixty-mile gale, on which the blown snow stung like steel shot.

The sled was slipping. The dogs stopped dead. The young dogs were beginning to bow downward in the middle of the line, and at any moment might start the wild dash downward which would have ended in death or injury to someone. "All but old Chinook. There the great dog stood at the head of the line unswerving. . . . Four feet planted, he stood there an example to his sons, a figure of strength, duty and courage. It was not enough."

Then Bill Macdonald crept above the sled and grasped the knotted rope attached to it. Walden gave the word and Chinook started. Each man dug in his creepers and helped on the sled. They were near exhaustion, and could go only in short rushes. But finally they crossed the slope and fell flat on the snow to rest.

But Belcher and Geiskop were not in sight. Ray Evans took fifty feet of rope and went back. He found them braced against a rock that jutted out of the snow. With only a ski pole keeping them from sliding down that quarter mile of sheer ice, they had made their way to this rock, and clung there till Evans rescued them.

At 1:25 p.m. they reached the summit, to find that Joe Dodge and Mohn had gone ahead and started a fire in Camden Cottage, with hot soup, tea, and baked beans ready for the party.

At seven that evening they were at the Glen House, and quite ready for one of Mrs. Pike's excellent dinners.

At that moment, no one would have dreamed that the feat of the Walden-Chinook party would ever be equaled, and surely not by a woman. But six years later Mrs. Florence Murray Clark,[2] of North Woodstock, New Hampshire, set up a new record as the only person to drive a dog team to the summit of Mount Washington without assistance.

Five feet three inches in height, and weighing perhaps 115 pounds, she was slim and wiry, quick in her motions, poised and active. She smiled broadly when telling of her experiences. Her eyes lighted as she talked about the friendliness, intelligence, strength, and willingness-to-work of her Eskimo dogs. "No matter how tough the going," she would say, "they never lay down and quit. But sometimes I wonder why I did it."

A good question for a girl born and brought up in New York City, who had never before climbed Mount Washington.

Mrs. Clark (then Miss Florence Murray) first learned about dogs when a neighbor, Edward P. Clark, in 1919, brought from Labrador a team of Eskimo dogs. From him she learned to drive dogs, and after their marriage on 10 November 1922 the couple moved to West Milan, New Hampshire, to raise dogs.

Six years later they moved, by dog sled, through the unbroken snow of Pinkham Notch to North Woodstock, New Hampshire, and started showing dogs and occasionally selling one.

Florence Clark used to drive about 2000 miles a winter in training for races, but this was on safe roads and trails in the lowlands.

It is one thing to drive dogs on a trail—quite another to drive up over the rocks and ice and hard-packed snowdrifts on Mount Washington in subzero weather, with winds that might blow the dogs into a huddle, and icy slopes that could avalanche sled and driver into ravines below.

John T. Brady of the *Boston Post* suggested the climb up Mount Washington. But after telling Brady that she was afraid of the climb, she set her fears aside and let him plan and take charge of her first trip. This was on 13 January 1932, a windy, squally, cloudy day, and it was a struggle all the way up for Mrs. Clark, five men, and eight dogs. They were almost at the summit, in thick clouds, when they found that Donnell, a photographer from the *Boston Post*, was unconscious. So they turned back to the Glen.

But now Florence Clark was determined to do what no other woman had attempted, and, on 21 February, she started again for the summit. Winston Pote, the photographer, went as guide, with Richard Campaigna of Berlin and Asa C. Osborn of Boston. They started from the Glen at ten o'clock at night, hoping to reach the summit in time for a photograph there on the 150th anniversary of the birth of George Washington.

But again they were doomed to disappointment. At the fifth mile mark, trying for a shortcut over Nelson Crag—which is a bit like the side of a house—the dogs got into a fight; Pote got lost, and in the midst of a vicious frost storm covering them with rime, they turned back.

Then she decided to go again, and to go alone. After careful preparation, she started on 3 April, with five dogs and a sled loaded with 150 pounds of duffle—canned goods, sleeping bag, blankets, camera, gun, an axe, and other supplies. She had finally decided to take two good men with her, but at the last moment there was a mix-up of dates, and she went alone.

Florence Clark reached the Halfway House at seven that night. She had arranged with Elliot Libby of the Glen House that at seven each night she would set off a ten-minute railroad flare—one if all was well; two if she was in trouble.

She found the Halfway House with the door left open and the room full of snow—"a filthy mess left by some person with no sense of responsibility for the next person who might come in exhausted, and needing warmth quickly." She cleaned the place, made her dogs and herself comfortable, and spent the night.

She had breakfast the next morning, and then went to the attic to find a pair of crampons which Win Pote had told her she might borrow. She opened the trunk and—*no crampons*! She was wearing high rubber boots with leather tops—almost useless on ice. Crampons are the number one essential in climbing in winter. But she was half way up and would not turn back.

They made a good start, and were approaching Nelson Crag. Clarkso, the lead dog, who never forgot a place, especially if it meant trouble, gave one dirty look at the Crag and another dirty look at Mrs. Clark, and stuck to the road.

At the Five-Mile Post, every winter, there is a huge sideling drift that covers the road for about three-quarters of a mile. It gets steeper and steeper as you ascend, and tops a two-thousand-foot slope that ends far below in jagged rocks. A slip there means almost certain destruction. The icy surface of the snow had melted enough for the runners to cut in, so the team got almost across when the sled struck ice, turned on its side, and started down the long incline. Florence yelled to the dogs; they had gone flat on their stomachs and were holding with their nails. She leaped over the sled and held it from below with her shoulder. Then something like the hand of Fate came to the rescue. For lashed to the sled, within her reach, was a spare axe she had picked up at the Halfway House.

Holding the sled with her shoulder, she managed to reach the axe, to chop a hole in the ice, and to thrust the handle deep into the drift to snub the sled from slipping. Swiftly, Mrs. Clark grabbed the axe she had brought from the Glen, and snubbed the sled a second time.

Although nearly exhausted she now had to unlash the load and carry it across the drift, before the dogs were able to pull the lightened sled to safety.

She placed one duffle bag containing the sleeping-bag, some canned food, a camera, a valuable gun of her husband's, and other equipment on a rock. As the dog team passed this rock, a playful young dog, Kak, curious about the strange object, nosed the bag over the side, and down it slid for a thousand feet or more to disappear in the tangle of rocks and scrub at timber line!

Driving the dogs to safety, and chaining Clarkso, Mrs. Clark lay on the snow and rested till she felt able to attempt the rescue of her precious duffle bag. Then, sitting on the snow and using the axe as a brake, she slid the thousand feet, to find the bag snubbed against a tree. It took a minute or so to slide down. But it was more than an hour later before she had inched her way back to the sled. This she accomplished by chopping out a step at a time with the axe. Then swinging it with her right hand, to drive it into the icy crust above her, she pulled herself up, hanging onto the axe handle with one hand and pushing the duffle bag ahead with the other. After that, holding the bag with her head, she would cut another step and repeat the terribly slow and tiring process.

Near Chandler Ridge, when they were headed for a drop into the Great Gulf, Mrs. Clark turned the lead over to Clarkso, who led the team up over a huge drift and around a treacherous field of ice. Here they lay down to rest.

A moment later they were surprised by a man with a huge dog. The man was Robert Scott Monahan, who, during his undergraduate years at Dartmouth, had become familiar with Mount Washington, and who even then was planning the weather observatory of 1932–33.

Monahan gave Mrs. Clark his crampons, but she insisted on completing the climb to the summit without help. There she had planned to spend the night resting. But Bob Monahan insisted there was a storm coming on, and that they must get down to the Glen.

At seven o'clock, Bob set off the "all clear" flare, answered by flashing lights from the Glen House. Somewhere below the Halfway House Mrs. Clark and Bob were met by three or four men who had come up (as they thought) for a rescue. For the flare set off on the icy crust had been reflected so that from the valley there were distinctly seen two flares, the signal for trouble.

There is a thought by George Leigh Mallory, who lost his life on Mount Everest, that applies to all such records: "Are we defeating an enemy? . . . No, we are simply overcoming our own weakness and fear."

There is just one more dog story that came as an aftermath of the tragedy of 31 January 1932, when Ernest McAdams and Joseph Chadwick were frozen to death near the Lizzie Bourne monument, almost at the summit. Informed of the tragedy in his office at the *Boston Transcript*, Bill Macdonald at once phoned Norman D. Vaughan of Hamilton, Massachusetts, sportsman and dog-sled driver who had been at the South Pole with Admiral Byrd. Without delay, Vaughan sped to Boston in his big open car, picked up Macdonald, and soon they were speeding northward over icy roads. After midnight they paused briefly in North Woodstock, where they wakened Ed and Florence Clark, and were rewarded with five Labrador Eskimo dogs and a sled.

From the Base Station the trail up the mountain was the railway trestle, and a dog team on a slippery trestle was a matter of gambling. It took all of the two men's strength, and all of Vaughan's know-how with dogs, gained in Newfoundland and on a fifteen-hundred-mile, three-month travel by dog team in Little America, to get the team one mile up the track to the Waumbek Tank. It was a day of hurricane



Mrs. Florence Clark's "victory smile" at the summit after her spectacular dog-sled drive up Mount Washington 3 April 1932. Clarkso and Nanook are at center.



Dogs are lowered over a cliff at Mount Washington, 1945.



Colonel Henry N. Teague, who bought Mount Washington Railway in 1931.



Part of the $60,000 damage to the cog railway caused by the hurricane winds of 21 September 1938.

winds, sleet, and a temperature of twenty-five below zero. The clothes of the searchers who had preceded Vaughan and Macdonald up the trestle froze solid on them. Their faces were beaten red by ice. But they brought the two frozen boys down on toboggans, Vaughan taking Chadwick's body the last mile by dog sled, to the great relief of the nearly-exhausted rescuers.

14. Colonel Teague Buys the Railway

ALMOST everyone who has much to do with Mount Washington sets up some sort of record. It may not be in the line of sports, nor yet connected with science. But if one has color in his make-up, and a love for the rough, tough old mountain, then he is almost sure to do something that marks him as a record-maker. Of such was the late Colonel Henry Nelson Teague, one of the most colorful characters ever connected with the Mount Washington Railway, and its owner and president for twenty years.

Henry Teague was a big man, six feet tall and large in proportion, who planned things in a big way and put his plans into operation. Nobody else has done so much to further travel to the summit, and to make possible year-round scientific research on the mountain.

By 1931 the cog railway had fallen into the position of a very unpopular stepchild of the Boston & Maine Railroad system. Because it ran less than three months a year, and never showed much, if any, profit, the problem of physical maintenance and of building each year an operating personnel had become a job which no official of the B.& M. wanted to tackle.

Such was the status of the cog railway when President Edward S. French of the B. & M. delegated his assistant, Laurence F. Whittemore, to get rid of the mountain road. Mr. Whittemore is a man who carries things through, as is attested by the fact that during the next twenty years he became the president, in turn, of the Federal Reserve Bank of Boston, of the New York, New Haven & Hartford Railroad, and of the Brown Company, the great paper-making firm of Berlin, New Hampshire, and Portland, Maine.

So Mr. Whittemore went to see Colonel William A. Barron of the

Crawford House and said: "Billy, Mr. French and the directors of the B. & M. have decided to sell the Mount Washington Railway. You know it's a great asset both to New England and to the northern part of New Hampshire. It would be a shame to see it go out of business. Mr. French wants you to get together a group of White Mountain hotel men to buy the cog railway and operate it. We will make the price and the terms to suit you. Will you do it?"

Colonel Barron said: "Whit, I appreciate your coming to me with this offer, and I will give you my answer now." He paused; leaned toward Mr. Whittemore, his hands planted firmly on the arms of his desk chair, and said: "My answer is 'No!' I have enough troubles of my own in the hotel business without taking on a railroad! What you need is a circus promoter; a man who can run the road, increase services, stir up new business, publicize the railway to get more people interested in taking the trip up Mount Washington."

Later, Mr. Whittemore came again to Colonel Barron with this news: "We are making progress along those lines you mentioned. We have contacted Henry N. Teague, and we believe we have interested him in the proposition. What do you think of him for the job?"

"Good!" replied Colonel Barron. "Henry is a real promoter. And he has energy enough to do the job as it should be done."

So the officials of the railroad and Henry N. Teague sat down and talked, arriving at what seemed like an almost grotesque conclusion—one man to buy a railroad, even a three-and-a-quarter-mile railroad, and force it to pay a profit when a great system like the Boston & Maine saw nothing in it but hard work and headaches.

But the oldest mountain-climbing cog railway in the world is no commonplace venture. And the man whose booming voice came to outdo the puffing of his funny little engines was no ordinary individual. Indeed, a man who could buy a railroad for $100,000—all on a mortgage—could not be "ordinary" in any sense of the word.

In the days of the Florida land boom of the twenties, Henry Teague was doing all right, till everything seemed to fall apart. Then, as he told a reporter in Miami, "I dropped about $1,000,000 down here." When the B. & M. officials asked him to take over the mountain railway, the two hotels at the top, all the land and buildings at the base, as well as the whole summit of the mountain, he told them he was broke, so they said they'd take his note. He said he didn't have money for operating expenses, so they put $10,000 in the bank for him.

"Of course the railroad is only three and a half miles long," remi-

nisced Henry Teague some years later, "but it now carries more than twenty-five thousand passengers each season. Since then I've had a new honor. I'm now postmaster of Mount Washington. It pays nine hundred dollars a year."

Perhaps nobody but Colonel Teague could have so successfully merged his personality and his life with this almost-dead summer railway and made of it "one of the world's most unique, interesting, and thrilling recreational attractions." Certainly it was only a man of far vision and exceptional courage who could have weathered those first few years, when antiquated equipment, untrained personnel, and foul weather posed continual problems that had to be met day after day. But there were days of sunshine when crowds began to respond to his persistent publicity. And there were men who built themselves into the organization, to return spring after spring to form the core of what is now a smooth-running group of seasoned railroaders.

Perhaps the most surprising thing about Colonel Teague's background was the fact that he had never before been in the railroad business. He was born on Mt. Desert Island, Maine, 2 June 1875, was graduated from Dartmouth in 1900, and was the first graduate from its Amos Tuck School of Finance in 1901. He took time out from college to serve as a private in Company E, First New Hampshire Volunteers, during the Spanish-American War.

Story has it that, when taking over the cog railway, he met with Colonel Barron and Governor John Winant of New Hampshire at the Crawford House. Billy Barron made some humorous comment on the fact that he was a colonel while Teague had served as a private. Thereupon the Governor said, "I will fix that," and appointed Henry to his staff with the rank of colonel.

After taking control of the cog railway, Colonel Teague increased the volume of its business five times, carrying 35,000 passengers in the peak year, compared to 7000 in the biggest season under former management. The largest single day's traffic has been 720 passengers, as compared to something over 300 for the record days of earlier years.

This increase in business was stimulated by the driving force of Henry Teague's continuous supervision and contagious enthusiasm. "Big, busy, and brusque," was one man's description of the man who not only kept the Mount Washington Railway from folding up, but also made it pay ample dividends. But sometimes it was difficult to see the difference between his brusqueness, and what might have been termed bad temper. Once when my wife hailed him with: "How are you, Colonel Teague?" his rejoinder was, "Just as cross as ever!"

Anyone who saw what he was up against in changing the old schedule of two trains a day to a train every hour on the hour; in inaugurating moonlight trains with searchlights for night driving; in doing away with unnecessary personnel by substituting college boys for most of the old-time union help; and in bucking weather that drove people away from the mountain, would agree that his occasional outbursts of wrath were not without provocation. Many a time during his first years with the railway he would sit on a piazza overlooking the base, wrapped in a huge overcoat, a big cap pulled down close over his shaggy brows (a cigar clenched between his powerful jaws, the ashes inching out unnoticed, falling finally over the overcoat), apparently miles away with some knotty problem, but keeping a watchful eye on everything going on around him.

But those who knew Henry Teague best conceived a lasting affection for him. They knew that he liked people and that he wanted them to like him. Never married, and having nobody closely related to him, he turned naturally to his railroad and his hotels and his college boys as his "family." The Colonel, as Henry Teague was known to everybody on the railroad from Mike Boyce, the oldest engineer in point of age and service, to the rawest college boy, was a great believer in profit-sharing. The bonuses that he distributed at the end of nearly every season helped many a student pay his next year's college expenses.

In all, forty colleges and universities have been represented by student workers on the Mount Washington Railway. These range all the way east from Colorado. Dartmouth and several Southern colleges have been most often in evidence. On the average about twenty-five boys are hired each summer. To become a railway engineer while still in college is a dream seldom realized. The first such college-boy engineer was Paul C. Dunn, Dartmouth '32, who finally was put in charge of all maintenance work on the mountain railway. On graduation he went to work for the Boston & Maine Railroad. In 1952 his sixteen-year-old son Stephen took his father's place on the Mount Washington Railway.

Among Henry Teague's early improvements was the development of the area called Marshfield at the foot of the railway. Here he built a row of modern, roomy cabins, as well as a large and commodious log-cabin restaurant and souvenir store. In its center is a huge stone chimney with two great fireplaces. There is seldom an evening when a fire is not needed.

Also at the base is located the president's spacious log cabin, the

boarding house for railway employees, a row of cottages for the married men and their families, train sheds, machine shops, and an electric power plant.

An important element in Henry Teague's success was his selection of an assistant and successor in the person of Arthur S. Teague, for several years vice-president and general manager, and since Henry's death in 1951, president of the railway. The two Teagues met in the fall of 1931, when Arthur was a senior at Clemson A. & M. College in South Carolina, and Henry, on his way to Florida, was visiting colleges to recruit next summer's crew. The similarity of names was a point of common interest which was later enhanced by the discovery that their ancestors Isaac and Newton Teague, who came from Ireland before 1800, were brothers. Once Arthur started work in 1933 after graduating in engineering, a strong bond of friendship developed which became a firm basis of successful management. Arthur entered the University of South Carolina the following fall to take his master's degree, continuing the summer work with the railway until called into war service in 1941 as first lieutenant of infantry. Rated by one of his commanding officers, Major General Raymond O. Barton, as, "in my estimation, the bravest man in the United States Army," Arthur Teague's war record was outstanding. Discharged from the army as a lieutenant colonel, he is said to be the most decorated World War II veteran in the State of New Hampshire.

During those war years while Arthur was overseas, Laurence Whittemore took over the position of temporary vice-president in charge of finances.

One of the big changes facing the Mount Washington Railway when the elder Teague took charge had been the dropping by the Boston & Maine, about 1930, of its feeder line from Fabyan to the base. For a while buses were run from the base to the Fabyan, Mount Pleasant, and Mount Washington hotels, but were soon dropped in favor of privately-owned automobiles. In former days most of the passengers were persons who spent several weeks in White Mountain hotels, but this business disappeared with the depression of 1930–32. So it was to the trippers who stayed at overnight cabins that Henry Teague made his appeal. Cutting fares on the railway, putting up roadside signs, distributing folders advertising the trip up the mountain, giving passes to hotel and cabin owners, and visiting every convention within driving distance gave Henry and his assistants long hours and weari-

some driving, but paid off in new friends for Mount Washington.

So fast did business volume build up under the new and aggressive management that on the Sunday before Labor Day in 1935, fifteen round-trip trains carried 535 people, and on 18 August 1936 nineteen round-trips totaled 659 paying customers. That night the Summit House counted 152 guests, thought to be the highest house-count up to that time.

One of the many useful and money-saving innovations that have come from the fertile brain and mechanical skill of Arthur Teague is the method of pumping fresh water to the summit. For years the only way of serving the summit colony with water was by means of a large steam pump in the railroad shops at the base. This consumed 150 tons of coal during the season, and required the services of two men to stoke the boiler and keep the pump working.

Teague installed a Pelton water wheel, driven by the force of water coming down the steep mountainside from Monroe Brook through a six-inch pipe. This water wheel runs a generator which produces electric current for two purposes. One-half the current turns a water pump which delivers ten gallons a minute to the Summit House tank through a two-inch pipe. The remaining current provides lights for the entire base colony as well as electric power to run all the machinery in the railroad machine shops. And all this for an outlay of fifteen dollars a season for oil and the part-time service of one of the mechanics, whose only duty is to oil the pump when necessary. This improvement is effected at a saving of $2000 a year.

Since the first pump was installed, two others have been added, each fed through a six-inch pipe laid on the railroad trestle from springs up the mountainside.

How well Sylvester Marsh and Walter Aiken planned and built is indicated by the fact that the same engines and cars, and the same roadbed, except as it has been renewed from year to year, have been in use for over eighty years. But while they look the same outwardly, the locomotives are given continual care by the men in the machine shop at the base. All moving parts are replaced at least every three years. Under the watchful eye of General Manager Arthur Teague, improvements were made which added to the motive power of the locomotives as well as to their safety. In 1938 the first new passenger car in forty years was built, and all the cars were enlarged to hold forty-eight instead of forty passengers.

Perhaps the most revolutionary improvement on the cog railway

was the installing of turnouts at the Base Station and the Waumbek Tank in 1941 and at the Gulf Tank the following year. Up to that time the road, like all other cog railroads, had been one-track. For a considerable time Arthur Teague worked with Lawrence Richardson of the engineering department of the Boston & Maine, to devise a turnout mechanism that would permit the cog apparatus to "cross-over" and to "turn out" and "level off" safely and satisfactorily on the mountainside. Although the device looks complicated, it can be worked easily by one man. It requires about eighteen different moves to operate the design, but it takes less than five minutes for the shiftover and the passing of two trains.[1]

So successful has this method proved that an engineer from the Panama Canal was sent to Mount Washington to secure blueprints of the turnouts. Similar ones are now in use at the canal, permitting "mules" to pass one another along the banks of the canal.

In September of 1938, Colonel Henry Teague drove to Concord on business. It was his good fortune that he went early in the day. A few hours later landslides closed the roads in both the Franconia and Crawford notches. The hurricane of 21 September that cut a devastating swath across New England and through the forests of New Hampshire destroyed Jacob's Ladder and a half mile of trestle. But Colonel Teague was not to be balked by hurricanes. He immediately borrowed money and started rebuilding. In five weeks the first train went safely over the rebuilt Jacob's Ladder. All the reconstruction was completed in time for the opening next spring. The cost of $60,000 was in sharp contrast with the original over-all cost of the railroad and equipment, said to have been $139,500. But no time was lost from carrying passengers; the road maintained its record of continuous service since 1869 except for the war year of 1918 and the World War II years of 1943–45.

A question often asked is: why was the hurricane damage on Mount Washington confined to the area of Jacob's Ladder? To this the weather observers offer this explanation: the highest velocity of the wind on the summit was 168 miles per hour, not sufficient to damage the buildings. The center of the storm was at the four-to-five-thousand-foot level, and the direction of the wind was not that which storms usually take at that level. The "Ladder" is almost on a level with a little col, or depression in the rock barrier which falls away precipitously to the south, affording passengers on the trains a magnificent view. Also, it is the most unprotected spot on the railway and so the windiest. With the hurricane centering at that altitude, it is little wonder that the

famous trestle was demolished while the far more exposed houses at the summit rode out the gale.

On 14 July 1949 the cog railway lived up to its lifelong record of "never an injury to a passenger," when a disabled engine plunged 1000 feet down the steep tracks, leaving a car full of passengers stranded on the rails. Fortunately, the cars of the little railroad are never attached to the engines while ascending or descending the mountain. The quick action of the brakeman in throwing on full brakes stopped the car and saved the passengers from anything worse than the scare of their lives.

The train was near the summit when one of the two rack gears of the engine broke. Engineer Michael Boyce of Keene, New Hampshire, a veteran of thirty years on the railroad, attempted to stop the engine, but the other gear gave way and the machine ran wild.

However, since the days of the Peppersass accident, additional safety devices have been added to the locomotives, which dig into the roadbed itself and positively stop any runaway. This device saved the lives of Boyce and his fireman, bringing the engine to a stop near the halfway mark. But the ties were so badly damaged that the upper half of the line was closed for repairs.

As an added and unexpected thrill, the stranded passengers climbed along the tracks to the summit and were brought down by automobile.

Sometimes people wonder how it is that, with most of the Presidential Range falling within the White Mountain National Forest, the considerable area at Marshfield, the cog railway itself, and the area at the summit which includes most of the buildings appear to be privately owned. Ever since it was built, the Mount Washington Railway has been the virtual owner of all these areas, with Henry Teague holding title from sometime in 1931–32.

But in 1938, when the hurricane had smashed Jacob's Ladder, it became necessary for Henry to borrow money for rebuilding. And it was to his alma mater, Dartmouth College, that he turned for financial assistance. Hence, when he died in 1951 without heirs, it was altogether fitting that he should repay his obligation by leaving all his property to the college. So Dartmouth has become perhaps the only college in the world to own a railway, two hotels, and the summit of an important mountain. But, to understand how this came about, it is necessary to follow through some intricate, though interesting, research.

On 22 June 1831 the Legislature of New Hampshire voted that the

Governor, with the advice and consent of the Council, appoint some suitable person as Land Commissioner to sell such public lands, including Mount Washington, as he might think proper for the interest of the State. On 1 July James Willey was appointed.[2]

In pursuance of this authority Willey gave a deed on 31 May 1832 to Jacob Sargent and others, conveying for $3000 a 25,000-acre tract of land, known later as Sargent's Purchase. The boundaries of the land were not clearly defined, and no mention of the mountain is contained in the deed.[3] It is not even known whether the fact that the summit of the mountain was included in the area conveyed was appreciated at the time, but it is unlikely.

Through various conveyances the title to Sargent's Purchase, and therefore to the summit of Mount Washington, came in 1846 to Samuel D. Cowes of Portsmouth, New Hampshire, and David Pingree of Salem, Massachusetts, who sold it in 1853 to the Jackson Iron Manufacturing Company, a corporation of which Mr. Pingree was for some years president.

Pingree was one of the earliest of the great timber barons of the North Country. His early interest in Mount Washington is shown by this gleaning from Ethan Allen Crawford's hotel register, dated 2 July 1834:

> David Pingree of Salem, Mass. Arrived here at 12 o'clock, dined, visited Mount Washington, returned here in the evening having had no refreshment save some pure cold water; a little good old Mad Wine would have given it a good relish on the mount, and it is my advice that those who visit the summit take a little with them for the Stomach sake. . . .

A long series of events resulted in prolonged litigation over the title to summit properties. One of these was the state sale by Willey of 12,000 acres of land lying north of Sargent's Purchase, and including the northern peaks of the Presidential Range, the location of the Base Station and the Mount Washington Railway, excluding only the summit and most of the site of the carriage road. This was sold on 28 July 1835 to General George P. Meserve of Jackson and Samuel W. Thompson of Conway for $500. They soon sold 10,000 acres to Daniel Eastman, and after changing hands several times this land came into the possession of John Bellows of Exeter, New Hampshire, and Henry B. Wells of Brookline, Massachusetts. About 1858 they brought suit (Wells v. Company) against the Jackson Iron Manufacturing Company to establish ownership of the summit.

By the loose methods of conveyancing and surveying practiced at the time of the grants, the line between the two tracts had not been well defined, and the door was left open for a long contest. Wells contended that the westerly boundary of Thompson and Meserve's Purchase, running "*due* North" from the location of the Base Station, in reality was intended to mean that it ran to the "*true* North." This would have thrown the line which ran east from the base just enough farther to the south to include the summit.

After a long and costly litigation, the heirs of David Pingree ended the suit by paying $30,000 for the interest of Bellows and Wells, thus obtaining a clear title to the summit. About the same time the Jackson Iron Manufacturing Company conveyed its title to the Pingree heirs, and for many years the property was held by Ebenezer S. Coe of Bangor, Maine, and David Pingree, Jr., of Salem, trustees under the will of the elder David.

The complications arising from the various claims to the summit can be illustrated by the fact that on 17 October 1867 the state gave to one Auren W. Chase another deed of an area six miles in diameter, centering on the Tiptop House. What became of this grant or of a series of other claims and counterclaims that followed is clouded by the burning in 1886 of the Registry of Deeds in Lancaster, where all the various deeds were recorded.

When the Summit House was built[4] in 1873–74 the railway found that its original grant from the state of one acre on the summit was not large enough for this hotel of nearly 100 rooms. Therefore, enough of the rocky summit to accommodate the new building was leased from the Pingree estate for $3000 a year.

This yearly rental became a heavy burden on the owners of the railway, represented by its chief stockholder and manager, Walter Aiken. When asking for a reduction in the rent he wrote to the Pingree trustees: "We are willing to pay for our rights or fight for them; but we don't propose to do both."

Finally, in 1889, the railway petitioned the Railroad Commissioners for authority to take by eminent domain a part of the land of the Pingree estate on the summit "for station purposes." This resulted in a sharp contest between the railway and the Pingrees, but in the end the commissioners granted the petition, and awarded $2750 damages. Since this would have wiped out the yearly ground rental of $3000, the Pingrees brought suit in the Federal court in New Hampshire, asking:

1. That the court enforce a provision in the lease which gave the plaintiffs the right to buy the Summit House at the termination of the lease, at a price to be fixed by three appraisers; and

2. That the decree of the Railroad Commissioners be set aside, the plaintiffs alleging that the proposed taking was really for hotel purposes and not for legitimate railroad use.

Testimony was taken on behalf of both sides, and is preserved in a printed volume of the stenographic record.[5] Witnesses included veteran mountain guides, old-time surveyors (one of whom was James W. Weeks), railway officials and employees, and others familiar with conditions on Mount Washington. My grandfather testified as to weather conditions and the necessity of shelter for the throngs of visitors.

The case was argued at Portsmouth in August 1893 before Judge Putnam, who found for the plaintiffs on the first point, but sustained the defendants on the second point, refusing to set aside the decree of the Railroad Commissioners. Before the case could be carried to a higher court two events took place which hastened a settlement. In July, before the case was argued, The Glen House had been burned, and Charles R. Milliken withdrew from business in the White Mountains, thus relieving the cog railway of the competition of the Glen House stages. The following winter Mr. Aiken died of a gunshot wound received while duck-shooting in Maryland. His interest in the Summit House was bought by the Mount Washington Railway Company, and an agreement between the railway and the Pingree estate, of 30 April 1894, began to define the rights of the parties on the mountain today.

By this deed a forty-nine-acre circular area, having a radius of 825 feet from an iron pin set in a rock near the northeast corner of the Stage Office, was conveyed to the cog railway for $56,000. Included was the land and a ninety-nine-foot right of way centering on the railway from summit to base. By the same document the Mount Washington Summit Road Company was granted the right to maintain its road; to use, maintain, and renew the Stage Office and other buildings and stables; to use the space between the Stage Office and the Signal Station as a turning area; the right to pass over walks and passageways; and the right to use certain springs. The cog railway and the road company also agreed to exchange passengers and baggage, and they agreed that neither party would permit any waste or refuse to be exposed upon the summit. This document establishes the important

fact that the Summit Road Company owns no land upon the summit.

Following Mr. Aiken's death, his controlling interest in the Mount Washington Railway was sold by his estate to the Concord & Montreal Railroad, from which it passed later to the Boston & Maine Railroad, in whose hands it remained until sold to Henry N. Teague.

On 15 March 1910 the Mount Washington Railway Company purchased from the Conway Company a ten-acre rectangular tract located on the flat area just below and northeast of the summit. A right of way for the Summit Road Company was reserved. Subsequent to this the United States, under the Weeks Act, acquired all the surrounding area, except that occupied by the automobile road, as part of the National Forest.

These are the basic original conveyances, and all property rights on the summit today are subordinate to, and arise as a consequence of, these documents.

On 15 December 1939 the Mount Washington Railway Company conveyed its summit real property to the Mount Washington Club, Inc., and the Club executed a mortgage of $135,000 to the trustees of Dartmouth College.

On 2 October 1951 Colonel Henry N. Teague died, and under the provisions of his will his estate was left to Dartmouth College to establish, in part, a loan fund for students, and in part, a fund for the general purposes of the College. The principal asset of the estate is the stock of the Mount Washington Club, the name of which was soon changed to Mount Washington Summit House, Inc. So that, by the terms of Colonel Teague's will, Dartmouth College becomes the owner of the summit tract of some fifty-nine acres with the buildings thereon, the Mount Washington Cog Railway, and Marshfield at the Base Station of the railway.

Thus the College has become the possessor of one of the most interesting and valuable natural research laboratories in the world. How to continue the development of the recreational and educational possibilities presented, having in mind the greatest good for both the college body and the general public, is a problem which will take time and ingenuity to solve.

PART III

The Mountain as Teacher

15. The New Age of Science

DURING the 300 years since Darby Field made his two historic ascents, Mount Washington has presented three distinct personalities:

(1) *An enemy to be overcome.* This was the era of the Rosebrooks, the Crawfords, and the Copps, the pioneers who wrested homes and livelihoods from an unfriendly wilderness, and tamed the mountain to the point where parties could go and come with comfort and safety.

(2) *A competitor*, inciting men to pit their strength against one another and against the mountain itself in setting up records.

(3) *A teacher.* Now we come to Mount Washington as a great science laboratory, wherein men may discover the answers to many questions that have baffled scientists—questions about the rocks, the age of clouds and their water content, the upper air, the icing of airplanes, the making of rain and snow, the nature of rime and frost, and a hundred other puzzling items, including even the little gnarled trees at timber line.

That last has been the subject of much study and more complaint. The difficulty of getting through or over the scrub growth was mentioned by nearly every party that ascended the mountain before trails were finally cut through—by Darby Field and Josselyn and that first party of men who came to Abel Crawford's for the express purpose of climbing Mount Washington, and who went away "with their expensive clothes," as the Crawford *History* has it, tattered and torn. That first scientific party that visited the mountain, headed by the famous historian, Dr. Jeremy Belknap, mentioned the scrub at timber line, but made no effort to explain it. But now some attempt has been made to clear up the mystery of the gradual reduction in size of the trees as

one ascends. At about two-thirds of the distance to the summit (at altitudes varying from 4800 to 5200 feet) the trees end in stubby grotesques and impenetrable thickets. This is timber line. Of this extraordinary change, Ernst Antevs, the Swedish geologist, reported: "These Arctic relicts found a refuge here during and after the departure of the last continental glacier some 25,000 years ago. The belt above the continuous scrub forest is the alpine zone,"[1] often called Arctic.

There are three well-defined zones of plant growth at about the 5000-foot level on Mount Washington. The first is timber line itself, or the upper limit of the forest covering. Here, balsam fir (*Abies balsamea*), black spruce (*Picea mariana*), and paper birch (*Betula papyrifera*) are the three most important species. Balsam fir is the most common.

Starting a thousand feet below this point, the trees become smaller and smaller as the altitude increases. Branching becomes more and more dense, reminding one of a close-cropped hedge, on top of which a man may sometimes walk, but through which it is impossible to penetrate without chopping.

Dr. Robert F. Griggs contrasts this condition with tree lines in the Rocky Mountains and the Cascade Range where "the woods become more and more open as we ascend, and large trees of great age live close to the tree limit."[2]

Robert Scott Monahan, Dartmouth College Forester, who made an intensive study of timber line during his postgraduate years at the Yale School of Forestry, in discussing propagation of these dwarf trees by branching, says: ". . . a section of the lower branches becomes covered with humus and moss. The covered portion develops roots and the uncovered tip of the branch assumes an erect position. In this process a ring of small trees may be formed around a parent tree. The rotting of the covered connecting branches eventually develops independent trees."[3]

Chittenden,[4] in his investigations on the Presidential Range, found that balsam fir and spruce just below timber line rarely matured their seed and that the chief method of reproduction was the process known as layering, the same process described by Monahan.

Timber-line conditions have attracted the attention of climbers and scientists since earliest times. In 1784 the Reverend Dr. Manasseh Cutler of Ipswich, Massachusetts, accompanying the Jeremy Belknap expedition, reported: "The spaces between the rocks in the second

zone, and on the plain, are filled with spruce and fir, which, perhaps, have been growing ever since the creation, and yet many of them have not attained a greater height than three or four inches."[5] Dr. Cutler was the first expert in botanical research to visit Mount Washington.

Sir John Dawson, in 1862, also drew a word picture of this interesting phenomenon: "In ascending the mountain . . . the spruces of this zone gradually degenerate, until they present the appearance of little gnarled bushes, flat on top and closely matted together, so that except where paths have been cut, it is almost impossible to penetrate among them. Finally, they lie on the ground, and become so small that . . . the reindeer moss may be seen to overtop the spruces."[6]

There is a tradition, many times repeated, that these dwarf trees are of great age—"These trees are the oldest of living things, even exceeding the giant sequoias," is often heard on the side of Mount Washington. But as Griggs tells us: "From comparing the extensive, close carpets formed by the White Mountain timber-line trees with the highest cripples of the Rocky Mountains, I have the distinct impression that . . . the trees of the White Mountains [are not older, but merely] . . . appear to have penetrated a more severe climatic zone."[7]

As a matter of fact, half a century is a good age for any of the *trunks* in this forest, and very few of them have more than a hundred rings. It is possible, however, that the trees themselves are very old, even several times the age of their present trunks. This is because they behave more like shrubs than trees with a single trunk. Since their branches root freely at any contact with the ground, it is possible for these trees to renew their youth and so persist indefinitely.

There is a second type of growth, known as *krumholz*, a German word meaning "gnarled wood." This term is applied to the scrubby growth of woody plants found in the neighborhood of timber line. Still higher than timber line is a zone which Harshberger[8] terms the "fell-field" and defines as a "rocky flat, or plateau, situated in arctic or subarctic regions or on the alpine summits of mountains." Its vegetation includes an abundance of lichens and mosses and many species of plants of dwarfed size.

Notable among the many fell-fields on the Presidential Range are Bigelow Lawn, in the col between the cone of Washington and Boott Spur; and the Alpine Garden, on the easterly slope of the cone above the rim of Huntington Ravine, and Monticello Lawn, on the eastern slope of Mt. Jefferson above the Knees.[9]

Naturally the question arises, "What causes timber line?" Why are

trees shorter the higher up they grow, and why do they stop altogether when a certain altitude is reached? The obvious answer—the one that is most often offered by would-be givers of information—is that the climate at the summit is too severe for trees, and that mountains are colder on top than at the base.

But temperature is not the answer. The boreal regions of the Arctic belts in Siberia, Alaska, and the Canadian Northwest territories are the real "cold spots" of the world, yet they support tree growth.

What seems to be a most important factor in timber-line production is the almost continuous and usually strong wind that sweeps over the summit of Mount Washington. The highest wind velocity ever recorded was clocked on this summit. In winter it undergoes an almost unending hurricane.

Actually, while wind is a dominant factor in stunting of trees on the higher slopes, it is by no means the only reason for the presence of the gnarled cripples that make up timber line. After a very considerable study of timber line, Robert Monahan has found a score or more of causes—summer frosts; the drying effect of high winds, causing the tree or a portion of it to die of thirst when moisture is not available to its roots; snow deposits which come in practically the same positions each winter; altitude; soil temperature; fog condensing on the needles of trees, the droplets clogging the stomata or breathing pores and thus leading to starvation of the plants by interfering with the entrance of carbon dioxide from which they make their food; and others. One of the conditions not found in the lowlands, and one which may have much to do with the stunted condition of timber-line trees, is excessive solar radiation due to altitude, causing rapidly fluctuating temperatures. Trees growing in this zone are unable to maintain their life processes continuously, and growth becomes exceedingly intermittent.[10]

But for all the studies that have been made by distinguished scientists, the predominant cause of timber line is still a mystery. The fact of its being is still a matter of wonder and speculation.

At first glance, the rock-strewn, wind-swept cone of Mount Washington appears to be an arctic wasteland, or perhaps a huge dump where Nature, having fashioned all the hills and mountains, upturned the supply truck and poured out into one great, useless heap all the leftover material. How could anything grow in that pile of rocks? Particularly, how could anything as delicate as a flower hope to take root, to develop, and to blossom in that forbidding and unfriendly atmosphere?

Yet in 1900 a group of four men from the A.M.C. spent a week hunting for flowers on Mount Washington, and discovered 105 species. Their list, slightly enlarged, was published in *Among the Clouds* on 5 July 1907, on the occasion of the forty-second field meeting of the club and the fourth held on the mountain top.

Since then, this list has been greatly enlarged by Professor M. L. Fernald[11] and Professor Arthur Stanley Pease.[12] Ernst Antevs[13] gives sixty-three arctic species from data furnished by Fernald, and 126 boreal plants in the Alpine zone of the Presidential Range from data furnished chiefly by Pease.

Those plants most frequently found above timber line are among the sixty-three listed as "arctic." These species are comparable to the flora found on the Labrador coast at Hopedale, 775 miles to the north of Mount Washington, in latitude 55½°N. The latitude of the White Mountains is 44°N.

Of the sixty-three species of arctic plants only three are indigenous to the White Mountains—are found nowhere else: alpine cinquefoil, mountain avens, and eyebright.

But how does it happen that these flowering plants took root and survived on the rugged surface of Mount Washington? Two factors made this possible:

1. The formation and ultimate raising of the Presidential upland to its present 5000-foot level. All along this upland, in the Alpine Garden and Bigelow Lawn and along the stretches of the Gulfside Trail, are found little springy places where water from subterranean sources wells up to keep plant life flourishing.

2. The actual importation of arctic flora into the temperate zone by the last continental ice sheet that covered even the top of Mount Washington.

Climatic belts, and zones where life was possible, were gradually pressed southward in front of the ice. Later, as the ice melted, these belts migrated northward once again. The arctic flora of Mount Washington are the descendants of plants that either colonized the mountains shortly after the melting of the ice or found a favorable home in this cool region later when the nearby hills and valleys became uncomfortably warm and crowded. Antevs says that this immigration began roughly 25,000 years ago. He says: "The plants form an arctic relict colony, a sample of the flora that colonized New England when it was newly exposed by the melting of the last continental glacier."

Following Dr. Cutler came Dr. Jacob Bigelow of Boston, who ascended the mountain in July 1816. With him was a notable group,

including Dr. Francis Boott, like Bigelow a physician and botanist, who is remembered in Boott Spur; Lemuel Shaw, afterward chief justice of the Supreme Judicial Court of Massachusetts; Francis C. Gray, distinguished Salem, Massachusetts, lawyer; and Nathaniel Tucker. In his account of this trip, Bigelow tells of the difficulties encountered in climbing without a trail and through the scrub. He mentions reaching "a second plain"—the "Presidential upland." "There remained now to be ascended only the principal peak, the one designated in Winthrop's Journal[14] by the name of the *sugar loaf*, and in Belknap's *New Hampshire*[15] by the name of Mount Washington."[16]

In a bottle which they cemented to the topmost rock, the party left this record:

Parce, viator,
cui fulmina parcent—
Hoc fragile monumentum
Lemuel Shaw
Nathaniel Tucker
Jacob Bigelow
Franciscus C. Gray
Franciscus Boott
Bostoniensis
Die Julii 2do, A.D. 1816
Monte Agiocochook superato
hic reliquerunt[17]

Here, Dr. Bigelow said, are found plants native to Siberia, Lapland, Greenland, and Labrador. With the aid of Dr. Boott, he compiled a list of about fifty such plants, or perhaps a third of all known varieties found by countless searchers to the present time. Dr. Boott returned to the mountains in August of the same year, when he added a considerable number of species to the botanical collection.

One of the noteworthy events of Dr. Bigelow's visit to Mount Washington was the calculation of its height from the registration of a mountain barometer and thermometer readings compared with observations at Cambridge, Massachusetts. He reported the altitude as 6225 feet, the nearest approach to the actual height made up to that time.

High praise for Dr. Bigelow's list of Mount Washington plants as determining "in great measure the phaenogamous botany of our Alps," came from Dr. Edward Tuckerman, Professor of Botany in Amherst College from 1858 until his death in 1886, who was known as the most painstaking botanist among the mountains.

By one of the choicest bits of coincidence, Dr. Bigelow's name is preserved in "Bigelow Lawn," that grassy plat, rich in Alpine flowers, where the cone of Washington joins Boott Spur, and not far from the headwall of the great ravine named for Tuckerman.

Asa Gray, author of Gray's *Botany*, says that "the most distinguished botanist of New England"[18] was William Oakes, who visited the White Mountains with his friend Dr. Charles Pickering in 1825, 1826, and every summer from 1843 to 1848. Born in Danvers, Massachusetts, 1 July 1799, Oakes came early under the spell of Mount Washington. He spent his summers exploring the mountains for botanical specimens, his interest in natural history having developed under the instruction of Professor W. D. Peck of Harvard, where Oakes graduated in 1820.

His most lasting contribution to White Mountain knowledge was his *Scenery of the White Mountains*, published in 1848. In this book William Oakes describes various scenes in the mountains, illustrated by large lithographic plates from drawings by Isaac Sprague, and two by George L. Frankenstein, a well-known Cincinnati artist, for whom a cliff and a railroad trestle in the Crawford Notch were named.

Oakes' description, as well as Sprague's drawings, are marked by rare faithfulness and accuracy. Writing of them, the Reverend Dr. Thomas Hill, sometime president of Harvard College, says: "If one would recall particular scenes, he must have recourse to the descriptive pen of Mr. Oakes, and the daguerreotyping pencil of Mr. Sprague, whose only fault seems to lie in the faithful prosaic accuracy of his drawing."[19]

Oakes had planned a smaller volume, to be called "The Book of the White Mountains," to be both a guide for tourists and a source book for botanists. But this purpose was ended by his untimely death by drowning 31 July 1848, when he fell overboard from a ferryboat between Boston and East Boston as a result, it is supposed, of a sudden attack of faintness or vertigo.

He took a notable part in suggesting names for the mountains. Naming Mounts Clay and Jackson, Oakes sent his guide to the summit of the latter to kindle a bonfire to celebrate the event.[20] His own name is remembered in Oakes Gulf, the deep ravine to the east of Mounts Pleasant and Franklin, christened by Professor Edward Tuckerman of Amherst College.

In July 1829 Dr. James W. Robbins of Uxbridge, Massachusetts, friend and correspondent of William Oakes, spent a fortnight in the

mountains collecting plants, with Ethan Allen Crawford as guide. He made the first scientific study of the whole range, and left the first account of descending into and crossing the Great Gulf, the huge ravine between Washington and the Northern peaks.[21] That same year came the naturalist Nuttall who previously had discovered several species of great rarity. Some of them have hardly been seen since.

Ethan Crawford, the "Giant of the Mountains," found great pleasure in seeking the tiny Alpine plants that bloomed in odd niches high up on the shoulders of Mount Washington. On one such trip, in the summer of 1829, he not only added to the growing botanical collection, but also discovered the famed Snow Arch in what is now known as Tuckerman Ravine. Speaking of the "Arch" or "cavern," he said: "Such was the size of this empty space that a coach with six horses attached, might have been driven into it. . . . I did not go far into it . . . but it appeared to be of considerable length. It was a very hot day, and not far from this place, the little delicate mountain flowers were in bloom. . . . There seemed to be a contrast—snow in great quantities and flowers just by—which wonderfully displays the presence and power of an all-seeing and overruling God, who takes care of these little plants and causes them to put forth in due season."[22]

Professor Tuckerman started his visits to the White Mountains in 1837, and continued them for almost every year of his life thereafter. While his name is most popularly remembered by Tuckerman Ravine, he did great scientific service through his chapter in Starr King's *The White Hills*[23] in which he divided the Presidential Range into four zones, characterized by their vegetation:

1. *Lower Forest*—made up of rock maple, beech, white and yellow birch; often white pine, fir, white spruce, aspen, witch hazel, and mountain ash.

2. *Upper Forest*—composed of black spruce and fir, with occasional yellow and canoe birch, Frazer's balsam fir, and mountain ash. At 4000 feet of altitude these trees are dwarfed but very strong, growing close together to form an almost impenetrable thicket.

3. *Sub-Alpine Region*—the habitat of mountain sandwort, evergreen cowberry, Labrador tea, and mountain bilberry.

4. *Alpine Zone*—where grow many plants peculiar to Labrador and Greenland. There are fifty or sixty of these species; also as many more lowland species which have migrated to the rocky cone of Mount Washington and manage to live there in favorable seasons, though often much dwarfed. Lichens are very conspicuous and beautiful. One,

of a sulphur yellow color, is quite noticeable, a good indication to the visitor that he has arrived in the Alpine zone.

Lack of limestone in New Hampshire, and consequently of lime in its soils, accounts for the absence of certain rare ferns that are common in the Green Mountains of Vermont. Only one of the rarer American ferns, the fragrant shield fern, may be seen on Mount Washington. The club mosses, or lycopodiums, often known as ground pine, are common; and one rare species (*Lycopodium selago*) is found on Moosilauke and the Presidential Range. One interesting plant found in this upper region is reindeer moss, a common article of food for reindeer in Lapland.

The flowers of Mount Washington have been the subject of poems inspired by the rugged tenacity of these frail and lovely little blossoms, which Coleridge has called, "Ye living flowers that skirt the eternal frost!"[24]

It might seem that animal or insect life on Mount Washington would be as lacking as the snakes in Ireland. That is certainly true of the Alpine zone, where, according to Antevs: "Reptiles, amphibians, and fishes appear to be lacking altogether."[25] In fact in this area, says Dr. Antevs, "The fauna is strikingly poor both as regards species and individuals."

There has been but little study of the animals or birds found above tree line, probably because not many of either are to be seen. However, back in 1893, from 8 to 17 July Gerrit S. Miller[26] did make such a study, trapping animals at the head of the Great Gulf (5500 feet), in the Alpine Garden (5000–5200 feet), and at the Lakes of the Clouds.

He found a northeastern chipmunk living in the rocks immediately below the Summit House. Red squirrels and flying squirrels now and then are seen on the summit. Mr. Miller found a woodchuck or groundhog that had strayed almost to the summit. Although the Canada porcupine is common enough in the lower woods, no record of one above timber line is found until some forty years ago when one was killed at the Madison Spring Hut. Unfortunately, this "porky" was a pet of Ken Swan, the hut caretaker.

Mice seem to be fairly frequent visitors on the mountain. Mr. Miller collected five species and subspecies. The redbacked mouse is the only mammal found in abundance in the Alpine zone. Miller found it under buildings at the summit, in stone fields, moss mats, scrub thickets, and on the shores of the Lakes of the Clouds. The Canadian white-footed mouse is found occasionally throughout the Alpine zone, while an-

other variety of white-footed mouse was found about the summit buildings. Miller trapped eight specimens of fieldmouse at the Lakes of the Clouds and at the head of Tuckerman Ravine. They were living among rocks covered by a dense turf of *Carex concolor* and other plants. An eastern meadow mouse was trapped in the Alpine Garden.

Two shrews, the common or masked shrew and the eastern short-tailed shrew, were collected by Mr. Miller. He also caught a star-nosed mole in the Alpine Garden.

Of birds, Miller observed only the junco, the white-throated sparrow, a robin, and a thrush.[27] The junco was seen frequently at the Lakes of the Clouds and in the Alpine Garden, and occasionally at the Summit House. The sparrow was heard often along the headwall of Tuckerman Ravine, and rarely in the Alpine Garden. Allen H. Bent reports that a bald eagle is seen occasionally soaring above the mountains.[28] In 1904, while eating my lunch above timber line on the Osgood Trail on Mount Madison, I watched a bald eagle making circles in the sky not far above my head. He seemed to be interested in the idea of sampling my food.

On account of the strong and frequent wind the birds generally keep away from the Alpine zone. So far as is known, the junco is the only bird that nests in this barren region.

Bradford Torrey also studied the birds of Mount Washington. During a visit to the summit 22–29 August 1900, he listed only six species.[29] These were the slate-colored junco or snowbird, myrtle warbler, American goldfinch, red-breasted nuthatch, sharp-shinned hawk, and American sparrow hawk. He found a few juncos nearly always about the stables. The other birds were seen or heard only once or twice.

Often, when one passes through the scrub forest in the subalpine zone, song birds are heard, giving rise to the belief that birds are numerous on Mount Washington. This is accounted for by the fact that several of the best singers, including the hermit thrush, the olive-backed thrush, Bicknell's thrush, and the winter wren, nest in or among the dwarf trees.[30] However, these songsters seldom if ever are seen on the exposed slopes above timber line.

J. H. Emerton, in his study of the spiders of New England,[31] lists three that are strictly arctic-alpine, that is, are relicts of ancestors deposited there by glacial action in far distant eras. These are *Epeira carbonaria*, which lives among the barren rocks from 5000 to 6000 feet in elevation, making a round web between the stones, which it closely matches in color; *Lycosa albohastata*, a ground spider; and *Lycosa pictilis*, which is known above the 5000-foot altitude.

One of the most persistent of entomologists ever to visit Mount Washington was Mrs. Annie Trumbull Slosson. From 1900 to 1907 she spent part of every summer on the mountain. In her exploratory trips around the cone she collected nearly 3000 species of insects, most of which belonged in the valleys and along the lower slopes of the mountain, and had been blown up the mountainside by the strong breeze.[32] Several rare and beautiful butterflies were thus caught on the highest summits far above their breeding grounds. These included the banded purple, the faun anglewing, the mountain silverspot, and Milbert's tortoise-shell.[33]

Insects belonging to the Alpine zone are relatively few. Of them Antevs says:

One butterfly, the small and fulvous White Mountain fritillary (*Brenthis montinus* Scudder), is known only from this range. It inhabits in scanty numbers the subalpine scrub forest and is very rarely seen in the alpine zone. Its nearest relative, which has a subarctic distribution, does not occur nearer than Anticosti and southern Labrador. The White Mountain butterfly (*Oeneis* [*Chinobas*] *semidea* [Say]), the moths *Anarta melanopa* Thunberg and *A. schoenherri* Zetterstedt, the White Mountain locust (*Podisma glacialis* [Scudder]), and other insects are glacial relicts. The brown medium-sized White Mountain butterfly is frequently seen to flutter about and suddenly disappear among the rocks. On alighting it closes its wings back to back and settles upon one side, the points of the wings away from the wind. In this position the gray mottling of the under side of the wings makes it practically undetectable.[34]

Dr. Antevs' reference to the *Oeneis* (*Chinobas*) *semidea* as the "White Mountain" butterfly unintentionally takes away from Mount Washington the distinction of lending its name to this little brown beauty, so familiar to thousands of hikers. Back in 1892 Samuel W. Scudder captured an *Oeneis semidea* which he called the "Mount Washington butterfly."[35] In 1901 Sidney C. Carpenter, a well-known entomologist, appealed for the protection by legislation of our "Mount Washington butterfly."[36] He had heard that this interesting little creature was in danger of extermination by too eager and thoughtless collectors. To his plea Mrs. Slosson replied that *semidea* (the "almost goddess") was wonderfully abundant and in no danger of annihilation.[37]

Mrs. Slosson's first report of the Mount Washington butterfly seems to have been in 1894,[38] when she said that it was found also on a Colo-

rado mountain and nowhere else south of Labrador. At the same time she captured a specimen of the butterfly *Argynnis montinus*, which she said was found only on Mount Washington.

Back in 1825 Ethan Allen Crawford gave a somewhat different account of bird and animal life at the summit of Mount Washington:

> The butterfly was here, busily employed like ourselves, but, perhaps, not in the same way. I have here seen, seemingly, being a mile in the air and a mile above vegetation, squirrels and mice, near the top of this hill, and large flocks of ravens, ducks, pigeons, robins and various other birds, fly over and around; a flying squirrel was once caught here, and also a rabbit; partridges are found in the vicinity, and insects of various kinds.[39]

E. W. Nelson reported in 1918: "Under stones and logs near brooks and ponds (even up at . . . Hermit Lake on Mt. Washington) are easily found the active thread-like lungless SALAMANDERS."[40]

A development of special interest is the classification of the Great Gulf as a "Wild Area" under Regulation U–2 of the Forest Service. "This regulation provides for the preservation of primeval environment and specifies that primitive conditions of habitation and transportation shall be maintained." The Great Gulf is a glacial valley located between Mount Washington and the Northern Peaks of the Presidential Range. It comprises some 5400 acres of wilderness, traversed by a trail that skirts the West Branch of the Peabody River, and scales the headwall of the Gulf to join the Gulfside Trail. Within the area are the trailside shelters of the Appalachian Mountain Club and a few scattered stands of virgin spruce. The recommendation for this classification was made by Gerald S. Wheeler, Forest Supervisor, White Mountain National Forest, and was given final approval by the Chief of the Forest Service 15 October 1959.[41]

From the foregoing it may be seen that Mount Washington is a great natural laboratory in which anyone interested in the natural sciences will find ample scope for study.[42] Just how fortunate Dartmouth College may be because of the opportunities there presented for research in so many varied fields will be determined as faculty and students delve more deeply into the mountain's secrets.

16. Wind and Weather

SO VARIED is Mount Washington weather, and so full of unexpected, and sometimes tragic, extremes, that it will always attract the attention of scientists with a flair for research.

"To sample the world's worst weather spend a winter on Mount Washington," said the late Dr. Charles F. Brooks, director of the Harvard-Blue Hill Observatory, in Milton, Massachusetts, professor at Harvard, and president of the Mount Washington observatory. Then he laughed and qualified his statement: "At least, the mountain can dish up the worst combination of cold, wind, and blowing snow to be found at any permanently inhabited place on earth."

Bradford Washburn, famed conqueror of Mount McKinley and other formidable snow-and-ice-blanketed peaks, and director of the Boston Museum of Science, corroborates this, saying that, "With the exception of some isolated peaks in the Arctic and Antarctic, Mount Washington has the most *severe* weather in the world."

By "severe," he means that combination of almost continuous high winds, low temperatures, and rime-forming clouds that makes life in the open on New England's highest peak hazardous throughout much of the year.

As an example of the extremes of difference between weather on the summit and in the lowlands, the *Boston Evening Transcript* of 27 August 1856 carried this message, received over the telegraph wires of "The American Line, 28 State Street": "Gorham, New Hampshire, 27,—10½ a.m.—Snow on Mount Washington. Fine autumnal weather at the mountains. Three inches of snow on Mount Washington, and the other peaks are also covered. Tuesday noon the thermometer on Mount Washington stood at 21 degrees."

Often snow falls in June as well as in August, a stinging reminder that weather on these exposed heights is not comparable with even that in nearby valleys, and is in no respect on a par with that in Boston.

"Well," you may say, "it is farther north."

That is true; but Mount Washington is not merely north of Boston by the 130-odd miles shown on the map. For, geographers tell us, every 100-foot rise in altitude presents a climatic difference represented by traveling ten miles due north. The summit of Mount Wachusett in central Massachusetts is thus, in climate, 200 miles north of Boston. The summit of Mount Washington, by the same rule, is some 500 miles north of the latitude of its base, which lands you smack in Labrador, and explains why so many people have suffered from exposure and have even perished on the mountain during the normally "warm" months.

So, in early fall, when the valley-dweller wakes to see the Presidential Range white with a frosting of rime or snow, he should remember that this is but the advance guard of winter coming far from the north on the upper air. The short warm days of Indian summer still may cling to the valleys, but for Mount Washington, that "arctic island in the temperate zone," winter is already setting in. The mountain comes honestly by its varied and unaccountable weather, now soft and soothing as the southern slope of a Cape Cod sand dune; again as vile and treacherous as a typhoon in the Indian Ocean. Winter and summer, the winds that sweep endlessly over the barren mountain top may whisper as alluringly as a sultry harem favorite, yet turn as unpredictably to hurt and maim and even destroy him who listens, unprepared, to the siren's call.

Wind and weather! Listen to what those first weather observers on Mount Washington had to say about a November storm in 1870, as reported by S. A. Nelson:

> What varied sounds the wind has as it changes: Now howling, screeching, roaring, as though the building were surrounded by demoniac spirits bent upon our destruction. We shout across the room to be heard. Now it suddenly lulls and moaning and sighing it dies away. Then quickly gathering strength it blows as though it would hurl the house from the summit. The timbers creak and groan and the windows rattle; the walls bend inward; and as the wind lets go its hold rebound with a jerk that starts the joints again. The noise is like rifle-firing in fifty different directions at the same moment. . . . Then there is the trembling and groaning of the whole building, which is constant. Everything moveable is on the move. Books drop from the

shelves, we pick them up, replace them, only to do it again and again. Professor has just looked at the thermometer, finds the temperature . . . is now −40.[1]

The combinations of wind and low temperatures illustrate dramatically Mr. Washburn's statement that Mount Washington weather is, with few exceptions, the most severe in the world. For while more extremely low temperatures are found in the Swiss Alps and elsewhere in our own Western mountains, yet in the Alps there is much less wind. On the other hand, the perfectly foul weather Washburn encountered on Mount Fairweather in southern Alaska—terrific winds and rainfall of nearly three feet in a week—was accompanied by temperatures above freezing.

Severe subzero temperatures are frequent on the summit of Mount Washington. But it is when the thermometer hovers just above −50°F and the pressure falls to around twenty-two inches by mercurial barometer, that even hardened mountaineers scurry for shelter.

There are scores of stories about the winds on Mount Washington, their destructive fury and their sometimes humorous twists. Here is a tale that is vouched for by Lafayette Gosselin, formerly manager of Radio Station WMNE, Mount Washington.

During a recent winter it became necessary for him and a member of the Army experimental crew stationed on the mountain to go down to the "Oil Fields" an eighth of a mile below the summit, where are buried those great tanks of oil that keep the power lines glowing and the kitchen fires burning throughout the winter in the buildings of the summit colony.

Starting back to the summit, they were met by a gust of wind of hurricane force. Gosselin, an old-timer with Mount Washington gales, fell flat on the crust. The soldier, his feet swished out from under him, was on the point of being blown through the air when his right hand, in which he was carrying a large screwdriver, hit the icy surface of the snow. The screwdriver dug deep under the weight of his hand, and held him stretched out like a streamer in the wind till the sudden blast abated, permitting him to fall to the safety of the crusted snow.

Back in 1888, New England experienced a blizzard which has become historical. But up on Mount Washington, where life is just one storm after another, even the famous "Blizzard of '88" has been outdone. At least so says Ken Gould of Laconia, chief of the weather observatory on the summit for six years.

Now it must be remembered that though the storm of December

1942 was the worst of record, it is closely equaled in nearly every winter month. Then winds of hurricane force occur two out of every three days. Winds above 100 miles an hour come at least twice a month. They blow above 150 miles an hour at least once monthly. On a clear March day in 1944 the wind touched 193 miles an hour, ten years after the record of 231 miles was set.

So, when Ken Gould says the 1942 storm was the worst he ever experienced or ever heard of, it must have been something. It started by noon of 1 December with these forerunners of a major disturbance: a wind shift, a steady rise in temperature and fall in pressure, the envelopment of the station in clouds, and the beginning of snowfall. By 1 a.m. the wind had increased to over sixty miles per hour with gusts of hurricane force. In six hours that night the barometer dropped .43 inch, twelve inches of snow was collected in the wind-shielded precipitation gauges, and heavy icing slowed down the rugged, electrically heated anemometer (wind velocity recorder). During the following week the severe icing continued and it was necessary to de-ice both the anemometer and the windvane by hand.

As the center of the storm neared the station, the complete and accurate recording of the various elements was a full-time job for the three men on the mountain. One of their important jobs is to "take the pulse" of every storm. The observer on duty took observations and made records; the second man made barometer and telethermoscope readings (a gust of wind having damaged the thermohygrograph); while the third man kept the wind instruments de-iced.

Throughout the afternoon and evening of the second, the storm roared on without letup. The staff, now battered and sleepless, divided forces, with two men on and one off, sleeping three-hour stretches.

At one time the wind was averaging over 100 miles an hour every hour. It was becoming increasingly difficult to keep the anemometer de-iced and running. The building was rocking in the tremendous gusts, and the furnace was spitting streamers of fire three feet out the door.

For six days the super-hurricane winds continued. On 7 December wind velocity decreased, and on the eighth the storm ended.[2]

It is natural to describe the extremes of Mount Washington weather, for they are the dramatic highlights that "make" the front pages of city newspapers. Those perfectly lovely days when you can sun-bathe on the summit, and can climb or ski from morning till evening with never a fear of chill or hurricane seldom find their way into the news.

Painting of Signal Station in winter by W. F. Halsall, famous marine artist, after a visit to the summit in March 1886.



Interior of the Signal Station during the late 1880s.



G. E. thirty-six-inch arc searchlight installed 1892 on tower on Mount Washington.

Yet they are even more unusual than the evil days. And they may come at any season of the year. In February, March, or April there are glorious winter days when the air is calm and clear; the sun beats down hot on the summit, and the views are without comparison.

In summer I have seen the thermometer in the shade behind the Summit House at 50° on a still, clear day, while in front of the same house, in the sun and out of the wind, the temperature hit 100°. Dr. D. L. Loughborough, director of the Physical Research Laboratory of the B. F. Goodrich Company, says: "Our principal claim to fame is that we were among the pioneers in finding Mount Washington a valuable place to do research." But it must be remembered that, while Goodrich scientists were researching on the mountain during the 1940s, the first scientific party to make a winter home on the summit dated back to 1870. For it was during the winter of 1870–71 that Mount Washington became the site of the first weather observatory ever to be maintained on any mountain during the winter. This first observatory originated with Professor Charles H. Hitchcock of Dartmouth College, and a young graduate of Amherst College, J. H. Huntington. During the summer of 1858, these two had worked on a geological study of the shores of Lake Champlain, under the auspices of the Vermont Geological Survey, of which President Edward Hitchcock of Amherst, father and former teacher of Charles, was the responsible head. Huntington was eager to spend a winter on the mountain top, and he found in the professor a willing convert to the idea.

Lack of funds held up the plan until 1868, when Professor Hitchcock was appointed state geologist of New Hampshire. Huntington immediately applied for, and was appointed to, the post of assistant on the Geological Survey of the State. Commencing work in the spring of 1869, the two friends revived the idea of wintering on Mount Washington, and applied to Colonel Hitchcock of the Alpine House in Gorham, and lessee of the Tiptop House, for permission to use the latter house for the ensuing winter. The request was refused by the colonel—there seems to have been no relationship between him and his namesakes—but an offer of the use of the hotel on Mount Moosilauke was forthcoming, and Mr. Huntington and a photographer, A. F. Clough of Warren, New Hampshire, spent two months on that mountain during the winter of 1869–70. This experience proved of great benefit to the party that spent the following winter on Mount Washington.

So much popular interest was excited by newspaper accounts of the

observations on Moosilauke that Huntington felt that the chances of securing financial backing for the Mount Washington project were good. The first setback occurred when, for a second time, Colonel Hitchcock, in a letter of 23 April 1870, "courteously but firmly" refused to permit the expedition the use of the Tiptop House. It then happened that the cog railway was about to build an engine-house or depot at the summit. An inquiry about the possibility of using this new building elicited a reply from Sylvester Marsh that it was doubtful that the building would be completed, but that he wished the expedition success. Visits to him by Professor Hitchcock and Huntington found Marsh ready to co-operate if it proved possible.

A drive for money was started, offering to every contributor of ten dollars or more a pamphlet describing the history and results of the expedition. However, little interest was aroused, and the first of September arrived without a hundred dollars being subscribed. One ray of hope was seen in the offer of a prominent New York daily of $500 for daily telegrams and occasional letters sent them exclusively during the winter. But still the promoters had no money for a telegraph line.

It was then that they thought of the recently established Bureau of Telegrams and Reports for the Benefit of Commerce in connection with the War Department in Washington. Application was made to General A. B. Myer, the Chief Signal Officer, for financial assistance. This seemed logical since the Signal Service at that time fulfilled the functions of the modern Weather Bureau. But there were no funds available for the purpose, although there was promised an insulated telegraph wire to extend from the summit of Mount Washington to the Base Station, and, with the approval of the Secretary of War, an observer to work with them. The Chief Signal Officer could not permit weather reports to go to only one newspaper, since he proposed to furnish telegraphic weather reports to all principal newspapers in the United States, as well as to Chambers of Commerce.

In a letter of October 7, the Chief Signal Officer announces that he has sent to the State Geologist, three miles of insulated Kerite telegraph wire, two telegraph instruments, two sections and four conductors, to the value of ten hundred and thirty-two dollars; and that an instructed observer will probably be detailed to join the expedition.[3]

When the promoters found themselves almost on the point of giving up for lack of funds, help came from an unexpected source. In July, Mr. Durgin of the Sinclair House in Bethlehem had informed Profes-

sor Hitchcock that a relative of his by marriage, S. A. Nelson, of Georgetown, Massachusetts, was interested in the meteorology of Mount Washington, and wished to join the party. After some correspondence it appeared that Mr. Nelson was also anxious to raise funds —promising at least $500. Being formally accepted as a member, he set to work in September to solicit money. By December, when he climbed the mountain, he had raised over $800.

On 19 September the railroad company notified Professor Hitchcock that the trains would stop running the following day, the tracks would be torn up for needed repairs, and that, furthermore, the depot had not been completed for the use of the winter party. This would have halted the enterprise, had not Sylvester Marsh finally agreed to co-operate further.

Then followed days crammed with work from the first glint of frosty sunlight till the last of the purple shadows of early evening. The railroad remained in operation a few days to transport, free of charge, the coal, food, and other supplies. A room was partitioned off in the buildings, a double floor laid, and windows and doors installed. The telegraphic apparatus from Washington arrived too late for the train, and had to be carted over eight miles of hilly, muddy road from the Base Station to the Glen, and thence up the carriage road. Also most of the food supplies were taken up the road with a one-horse rig. The last load reached the Halfway House only to be stopped by a sixty to seventy mile wind. It was later carted by manpower to the summit.

In October the party was augmented by the addition of Howard A. Kimball, a photographer, of Concord, New Hampshire, who was becoming nationally famous through his stereographs. Mr. Clough had already accepted an invitation to come, so the two photographers formed a partnership, and did some splendid work during the ensuing winter.

During December, Sergeant Theodore Smith, sent as an observer by the Chief Signal Officer of the Army to help Professor Hitchcock, reached the mountain.

On 12 November Mr. Huntington climbed the mountain, and commenced taking and recording meteorological observations. Through the kindness of the superintendent of the two telegraph lines through the mountain region, switches were arranged at Littleton and Wells River so that a direct line from the mountain to Hanover, New Hampshire, could be opened, and permission was given by him to Professor Hitchcock to use the line for an hour in the evening when the regular

business of the telegraph company had been attended to. By adding a few yards of wire at Hanover, there was direct communication from the summit to the professor's office in Culver Hall at Dartmouth College.

> This was the only room in the building fitted for occupation, reached by struggling through piles of lumber, and balancing one's self upon a single plank placed over perilous depths. . . . Thus when the storms were raging, the snow flying, the mercury freezing in the thermometer, and transportation was impossible, there could be communication between the isolated adventurers and their friends.[4]

Students at Dartmouth College undertook to act as telegraph operators at Hanover. But, while they were enthusiastic "ham" operators they found that "switching on" and "switching off" and "calling" were sometimes difficult. Only through the help offered by the postmaster and telegraph operator at Hanover were the sending and receiving of messages between the mountain and the college made really feasible.

Climbing Mount Washington on 30 November 1870 was made more toilsome and hazardous by the ten-mile drive by pung from the White Mountain House to the Base Station. Even with a stout team of horses the unbroken snow proved a severe test. Two blowdowns across the road would have ended the trip had not one of the party walked ahead to the base to borrow an axe and a wood-chopper! After a lunch, the party of weather men decided to try the ascent, although the time was half past two, and the winter day short. Pushing upward for a mile, with clear sunlight tempting them on, they suddenly saw to the west an approaching storm lying over the Green Mountains of Vermont. Feeling that they might outdistance the storm they toiled upwards for another half mile to the foot of Jacob's Ladder. But there the storm struck with all its fury. As somebody reported:

> There were suddenly wrapped around us dense clouds of frozen vapor, driven so furiously into our faces by the raging winds as to threaten suffocation . . . the shroud of darkness that was in a moment thrown over us was nearly equal to that of the moonless night. Compelled to redouble efforts to keep our feet and make proper advance, we struggled with the tempest, though with such odds against us that we were repeatedly slipping and getting painful bruises . . . we all halted in brief consultation. It was suggested that we return to Waumbek Station, . . . and there try to keep ourselves from freezing by brisk exercise. Mr. Clough emphatically vetoed this as a most dangerous and impracticable proposition, saying that our only hope consisted in pushing upward with all our might.[5]

Three of the party then left the track, Mr. Kimball, who was exhausted, leaving behind his luggage. C. H. Bracy of Warren stuck to the track, took one fearsome tumble into a gorge, stopped at the ruins of the old "Gulf House" (Horace Fabyan's shelter), but, finding himself becoming dozy, struggled back to the track and reached the summit at seven o'clock.

Meantime the rest of the party stumbled forward; sometimes wallowing in snowdrifts to the waist. Without the efforts of Clough, Kimball would never have reached the summit. Finally, with the wind at seventy miles an hour and the thermometer down to 7°, they came to the Lizzie Bourne monument, and with a tremendous struggle made the last thirty rods to the summit.[6]

Laying the telegraph wire was a serious problem. If laid on the open rocks it might easily be blown about and chafed through. Also, if covered deeply by snow and ice it would have been difficult to locate in case of trouble. The railway ties seemed the only feasible place.

A sled seven feet long was constructed, the coils were placed upon it, one being mounted on a reel. One of us sat upon a [slideboard] . . . in front to guide the sled and the other was behind, sliding down hill. . . . The sled upon the railway glides smoothly down the steep grade, and the wire uncoils beautifully and is laid just where it is wanted. It was something fearful to pass over the high trestle below the Gulf Tank and on Jacob's Ladder, and even now it almost makes one shudder to think of those dizzy heights, the load we had, and the steep grade. But we reach Marshfield in three hours from the time of starting, and the wire has been successfully laid. On our return the wire is fastened down with eyelets close to the outer rail, and the summit is reached just at dark.[7]

Now came the inevitable breaks in the wire. It was fully a two-day job to search out the breaks and mend the cable. But at last all was completed; a six-foot drift at Lizzie Bourne's monument had been dug through to locate a "leak," and the amateur linemen, coated with snow and ice, came into the Observatory to find "the instrument working, and Littleton calling."

Small as was the one occupied room, the observers managed to squeeze into it all that was necessary for sleeping, cooking, eating, studying, and, of course, for telegraphing to the outside world. The Signal Service had insisted that the weather observations would be of great benefit to commerce, largely through the forewarning of storms that might destroy shipping, and through learning of the approach of clearing weather so that shipments might more quickly reach market.

The men on the summit found the "benefit of commerce" a reason or excuse for almost anything; as for example a Christmas dinner:

> Mr. K. devoted himself to the task of getting up a dinner worthy of the day. His efforts were entirely successful, and as the highest compliment we could pay him, we did full justice to the repast "our Blot" had prepared. The bill of fare embraced roast lamb, onions, canned peaches, corn-starch pudding, and sauces. It was not a bad dinner to sit down to on Mount Washington on Christmas day! Mr. S. [Sergeant Smith] and I did the smoking for the whole party; all for the "Benefit of Commerce."[8]

Spring comes late to Mount Washington. On 14 May the temperature was 11° at 7 a.m., with the wind as high as eighty. ". . . if the half-dozen almanacs on the shelf did not say that it was May we might think we had missed one of the winter months. How the wind howls—charming for 'merrie month of May!' "[9]

Following this first winter on Mount Washington, the work of the volunteer observers was taken over by the Signal Service, United States Army. Sergeant Smith was relieved by Sergeant M. L. Hearne. In 1874 the Signal Station, a sturdy one-and-a-half story building, was constructed for the weather men. Soon after that the old depot was destroyed by a winter gale. Weather observations were maintained continuously from 13 November 1870 until the fall of 1887, and in summer for five years thereafter, ending with the season of 1892.

> During these years a vast amount of valuable data as to the extraordinary weather conditions of this altitude were obtained. In the very first winter the thermometer reached a minimum of 59° below zero [5 February 1871], while the wind in January, 1878, and on one subsequent date reached a velocity, never equalled elsewhere, of 186 miles an hour.[10]

Twenty years after the mention by William Oakes (see p. 49) of Horace Fabyan's ruined stone house near the present Gulf Tank on the cog railway, Mike's House, or the Gulf Stationhouse, as it was also known to railroaders, was built, quite probably upon the same old foundations. In the days of the original weather observatory, from 1870, this was a useful resting place for the observers in their wintry climbs. At least once it was the means of saving the life of an exhausted Signal Service man, Sergeant William Line.[11]

Sergeant Winfield Scott Jewell, Signal Corps, U.S.A., born in Lisbon, New Hampshire, who was in charge on the mountain in the years 1878–80, was detailed to this station at his own request. His purpose was to fit himself for service in the Arctic, where he went later with the

Greely expedition, only to die of starvation on 12 April 1884, the first to perish of that ill-starred company. In January 1879 he guided my grandfather with a few friends up the railway track to the summit, bringing them safely through a gale that reached a velocity of 108 miles an hour.

Sergeant Jewell's name has a permanent place on Mount Washington through the naming by Bob Monahan of the Jewell Trail from the Base Station to the Gulfside Trail by way of Burt Ravine.

During this time it happened that two daughters of Ethan Allen Crawford, Mrs. Orville E. Freeman of Lancaster and Mrs. Charles Durgin of Andover, New Hampshire, were the first women to make a winter ascent. With their brother, William H. Crawford of Jefferson, and their nephew, Ethan Allen Crawford III of Jefferson Highlands, they walked up the railway track on a mild afternoon of 24 February 1874. The temperature fell on the way up, and when they reached the summit at 5 p.m. the thermometer stood at 8° below zero, with the wind at fifty miles an hour. They spent the night at the Signal Station, which was then in charge of Sergeant William Line and two others.

From then until 1904 no other woman is known to have made the ascent in winter with the exception of Dr. Mary R. Lakeman of Salem, Massachusetts, who walked up from the Glen House with a party of Appalachians in February 1902.[12]

Another record worthy of mention was made during three days of tramping under wintry conditions, in April 1887, by Cyrus E. Gale, then proprietor of the Eagle Mountain House, Jackson, guided by George Perkins. The first day took them up the Tuckerman Ravine path and thence to the summit of Mount Washington, which they reached by cutting steps in the icy covering of the cone. At the Signal Station the weather observers made them welcome over night. Also one of the observers sent a telegram to Jackson telling of the climbers' safe arrival.

Next day the hikers crossed the tops of Clay, Jefferson, and Adams. Then by more step-cutting they passed along the east side of Madison, and thence descended into the Great Gulf. No previous winter visitor, it is believed, had ever gone beyond the summit of Adams.

During the last hundred years there have been erected on the summit of Mount Washington two towers, or "observatories," the first for profit, the second for scientific purposes.

In the spring of 1854, "Timothy Estus"—probably Timothy Estes,

for several years a selectman of Jefferson—erected upon the summit of Mount Washington a structure which he called an observatory. It was forty feet high, and so arranged that, by means of a rope and gearing, a party of eight could be elevated at a time to a platform forty feet above the natural top rock, for fifty cents each.

This observatory cost about six hundred dollars, and, after being used part of the first season, was abandoned as a total failure. From that time till the summer of 1856 it stood; and the wind howled and whistled and screamed through it, making most unearthly music, till it was that season torn down, and the woodwork was used for firewood.[13]

In 1880 a wooden tower about forty feet high was built just back of the Summit House for the use of the United States Coast and Geodetic Survey, and afforded an unobstructed view in all directions. It was so situated that the theodolite used in the measurement of the angular distance between mountain tops and other fixed objects below stood exactly over the geographic summit of the mountain (now marked by a metal plate). From this perch a Dartmouth College professor and J. Rayner Edmands of the Harvard College Observatory (remembered in the Edmands Path across the Northern Peaks) worked during the summers of 1880 and 1881. Assistants were sent on sunny days to other mountain tops where there was no pole or other object marking the exact summit, and with an instrument called a heliotrope placed on the topmost rock they flashed beams of light to the watchers on Mount Washington, showing them the precise point at which to aim their theodolite.

In 1879, before the building of the tower, the triangulation work was done from Killington Peak in the Green Mountains, ninety miles from Mount Washington. The Tiptop House concealed the apex of Washington from the Killington party, and for several weeks a young man sat patiently every sunny day on a perch rigged on the ridgepole of the old stone house flashing at the Vermont peak. Only once in three weeks did they see his light, but the youth never complained. "I get my rations regularly," he observed, "and my pay goes on."

That tower of 1880 was the one Mr. Ives used for the General Electric searchlight on the summit (see p. 107). His statement that the tower was fifty-five feet high indicates that an addition of fifteen feet was made to the original forty-foot structure. After being used by visitors for some twenty years, the tower was deemed unsafe, and was torn down in 1902.

While life on Mount Washington for that first group of weather observers in 1870–71 was hazardous and difficult in the extreme, there were lighter moments when even weather-bound scientists might crack a joke.

Although newspapers generally printed the telegraphic weather reports from Mount Washington, and many went further in commenting editorially on the value of the enterprise, yet some writers saw nothing but folly in the entire undertaking, while certain humorists saw in it opportunities for side-splitting burlesque. Among the many accounts, the following seems to merit a prolongation of life:

December 10. Wind north by west, blowing with a velocity of one hundred and twenty miles per minute. Professor Smith venturing to stand on the windward side of the Observatory, was instantly flattened against the boarding. He was spread out over an area of eighteen square feet, and experienced considerable inconvenience from the disarrangement of his hair. Toward evening the wind lulled, and he was carefully detached by knives, and laid upon the shelf until means for his compression could be devised. . . .

December 18. After each member of the expedition had read a paper upon the "Malleability of Scientific Persons, as exemplified in the flattening of Professor Smith," an attempt to compress that gentleman was made. He was laid upon the floor and hammered, chiefly on his edges, by large sledge hammers. After six hours of continuous hammering he had regained nearly his former shape. He was entirely satisfied with the result.[14]

Seven years later, a self-appointed "Observer" wrote the following:

Base, Sept. 7th.

To the Editor of Among the Clouds:

A candidate for the proposed third signal officer on Mount Washington, has turned up at the Base "in a Horne". The following is a copy of one of his recent observations: Barometer 23,010 inches; thermometer, two feet below zero; direction of wind east northeast, half south in some states; velocity 727 miles per hour; state of the weather for Mount Washington and St. Louis, a rising barometer followed by falling or a stationary or both or a little of each or none at all; slightly warmer or colder or both, with clear or cloudy weather, with south-west to north-east winds, and possibly occasional local rains.

J. H. Observer

We would like to see any one describe the condition of our weather for the last few weeks any more accurately than our candidate, of whom we have just reason to be proud.

"Base"[15]

17. Bob Monahan Starts an Observatory

AFTER the old Mount Washington weather station was abandoned in 1892, many scientists from time to time made visits to the summit for individual studies. S. P. Fergusson of the United States Weather Bureau and the Blue Hill Observatory, near Boston, made three meteorological expeditions there in 1905, 1906, and 1907. He compared the pressure, temperature, humidity, and wind velocity on Mount Washington with records of the same elements obtained in free air at the same altitude by kite-meteorographs from nearby Twin Mountain. In August 1922 he returned to the summit to measure wind velocity in a three-weeks' test of different types of anemometers. During the 1930s he did pioneer work in upper-air research through kite flying from Mount Washington.

During Christmas vacation in 1926, Robert Scott Monahan was the leader of a small group of Dartmouth instructors and students who came to the summit to spend part of the Christmas holidays at Camden Cottage.[1] Numerous instruments were back-packed to the summit, where various observations of wind and weather were made during the limited time available.

Joseph B. Dodge of Pinkham Notch Camps joined the party and became so interested in the scientific aspect of the visit that he and Monahan commenced laying plans for the eventual establishment of a meteorological observatory.

But it takes time for such plans to ripen. Meantime, several important events took place that focused increasing interest upon Mount Washington as the site of a year-round weather observatory.

Two years after the visit of the Monahan party, Ernst Antevs made his study of the puzzling glaciology of the region. The results of his

study are found in his book, *Alpine Zone of Mount Washington Range.*[2]

Then, in the winter of 1931, Winston H. Pote, an expert both in still and movie photography and in mountain climbing, accompanied by Joseph Oliver of Lynn, Massachusetts, and a little dog, Rex, spent two months in the Camden Cottage on the summit, the first visit of such length on Mount Washington since the days of the old Signal Station. They carried with them weather-recording instruments loaned by Bradford Washburn and Joe Dodge. But the chief reason for the expedition was to secure photographs—stills and movies—of Mount Washington under the swiftly-changing conditions to be found there as winter merges into spring.

During the fall of 1931 a maximum-minimum thermometer was installed outside Camden Cottage by a representative of the United States Bureau of Entomology to obtain records of the temperature conditions to which several species of larvae were exposed. That winter the instrument was read and reset thirty-seven times by climbers. An interesting comparison between this thermometer's records and those of unofficial instruments in the valley was indicated. While the latter indicated extremely low temperatures, the minimum apparently recorded on the summit was −22° about 22 February 1932.

Science Service, which publishes a weekly *Science News Letter*, organized a party to occupy the summit during the total eclipse of the sun on 31 August 1932, with the idea that low clouds in the valleys might interfere with observations, yet permit work at higher altitudes. But Mount Washington was as perverse as might have been expected, and the summit was shrouded in dense clouds.

Since that 1926 visit to the summit, Messrs. Monahan and Dodge had kept alive the idea of reoccupying Mount Washington for scientific studies. Dodge was becoming deeply interested in mountain meteorology as well as radio development. He was convinced that the summit would prove an ideal testing ground for many radio problems, and that radio, in return, would provide far more reliable communication than the early mountain observers possessed. In the rescues of climbers overcome by fatigue, accident, or exposure, the two-way walkie-talkie radio, developed in the early thirties, proved its worth. The value of direct radio communication between the summit and Pinkham Notch Camp, Blue Hill Observatory, and other points, as well as the far more extensive studies of FM broadcasting as conducted by the Yankee Network have verified Joe's most hopeful conclusions.

While it was impossible to secure federal aid to establish a new weather station on Mount Washington, another factor spurred on the

plans for year-round observations. This was the plan announced by the International Polar Year Commission for a concerted attack during the years 1932–33 on many current scientific problems, by means of observations made at numerous isolated but strategically located stations. In September 1931 the Commission met at Innsbruck, Austria, and emphasized the importance of mountain stations in studying upper-air conditions.[3]

One of the purposes of the Polar Year was an effort to discover the reasons for and the frequencies of cyclones and anticyclones and to anticipate their occurrences in the northern hemisphere.

What a valuable contribution Mount Washington could make to the international program was recognized by the two American members of the Commission and by its Danish president.

Backed by world-wide agreement on the value of mountain meteorological stations, the reoccupation of Mount Washington for weather observations in the winter of 1932–33 became a foregone conclusion. It had the co-operation, in addition to that of the Polar Year Commission, of the New Hampshire Academy of Science, Massachusetts Institute of Technology, Blue Hill Meteorological Observatory of Harvard University, the United States Weather Bureau, and various radio investigators.

For shelter, the E. Libby & Sons Company of Gorham, New Hampshire, owners of the Mount Washington Summit Road, gave free winter use of the stage office on the summit. The Appalachian Mountain Club loaned cots, bedding, and kitchen utensils from the Lakes of the Clouds hut. The personnel were all volunteers—without pay—who wanted to work for the advancement of scientific knowledge. But money was still needed.

In May 1932 Joseph Dodge was invited to present the plan before a meeting of the New Hampshire Academy of Science. This he did so persuasively that the Academy gave him $400, virtually emptying its treasury. This assured the project of success.

But the factor that really penned the word SUCCESS in big capitals was the personnel itself. Those selected for the permanent group at the summit, with Monahan, were Alexander A. McKenzie and Salvatore Pagliuca ("Sal" to his wide circle of friends). A newspaper article gave this description of the party:

It takes a lot of ice and snow to keep Monahan happy. He has just returned from Alaskan combat with Mt. Fairweather [15,300 feet] in company with Bradford Washburn. Monahan is a Dartmouth man, class of '29,

and studied at the Yale school of forestry. Last year he was with the United States Forest Service in Idaho. He is a prominent member of the Appalachian Mountain Club, and is at home on skis and ice-creepers and in all sorts of weather. McKenzie, who is the expedition's radio operator, took his degree at Dartmouth last June, and while in college became an inveterate tramper of D.O.C. trails. Pagliuca, who is an electrical and mechanical engineer, is a native of Naples, a former employee of the General Electric Company at Lynn, and an enthusiastic mountain climber.[4]

These three were fortunate in having as a link to the outside world Joe Dodge of Pinkham Notch Camps. Through his short-wave radio he was in frequent communication with the summit and with Blue Hill Observatory and with Albert F. Sise of Brookline, Massachusetts, a radio operator and experimenter of many years' experience. Dodge had carried on meteorological observations at his home for the previous five years. Albert Sise for three winters had maintained thrice-weekly radio schedules with Joe, thus providing the only immediate communication from the Pinkham Notch Camps to the outside.

A man whose co-operation and advice were of immense and constant help to the project was Dr. Charles F. Brooks, at that time best known as director of the Harvard-Blue Hill Observatory in Milton, Massachusetts.

Late September and early October 1932 were devoted to transporting up the auto road the eight-months' supply of food; weatherproofing the stage office, and installing the various instruments. Standardizing and adapting the meteorological equipment to Mount Washington conditions was greatly facilitated by S. P. Fergusson's ten-days' sojourn at the summit.

The front room of the stage office, fourteen by eighteen feet, was fitted up as the observatory proper. In it were installed the radio equipment, library, atmospheric-pressure instruments, wind-velocity and solar-radiation recorders, plotting-board, writing-benches, files, spare instruments, heating-stove, and the usual paraphernalia in such a station. During the early fall the building was completely insulated with Cabot eel-grass quilting. New floors were laid, storm-windows fitted, wiring installed, and every step taken to insure the efficient transaction of the observatory business despite the prevailing weather conditions.

To permit direct communication with the outside world, the private telephone line, loaned by President Henry N. Teague of the cog railway, was connected at Fabyan with the Whitefield exchange.

On the western slope of Mount Washington, Charles A. Buckner, winter caretaker of the Base Station of the Mount Washington Railway, was to operate a meteorological comparison-station.

Winter comes early to Mount Washington. An October blizzard kept the observatory party storm-bound in the valley for several days. Then, on the fourteenth, they started for the summit. Winston Pote led the convoy with Albert Sise, breaking ruts through the frequent drifts for the heavily laden trucks to churn through to the stage office.

Next day the 1932 observers were visited by a total of seventy-five persons, who came by auto and afoot to view the winter preparations. One interested old lady, upon learning that the young scientists were about to make their first pilot balloon ascension, and assuming that one of them would ride away with the balloon, exclaimed, "My God!"[5]

During another snowstorm on 18 October two sterling mountaineers, Bill Macdonald and Norman Vaughan, arrived at the summit. The same day Joe Dodge returned with Mr. Fergusson, who was to aid in setting up the instruments. This was an old story to this weather-wise man, who in 1926 served as aerologist of the First Greenland Expedition of the University of Michigan. In addition to his former meteorological work on Mount Washington, Mr. Fergusson had built the meteorograph for the Mount Rose station in Nevada, and for El Misti in Peru.

While the usual observatory day lasted from 6 a.m. to 11 p.m., there were many occasions when a twenty-four-hour watch was maintained. These were nights when unusual clarity of the air made long-distance observations possible; or when the northern lights were on a rampage and had to be photographed and recorded; or nights when storms swept over the summit with such violence as to threaten to carry away the building or blow chunks of ice or frost through a window; or when extremely low temperatures forced the running of a red-hot stove, which might result in an overheated chimney. Fire was an ever-present menace, for a fiery chimney might well cause the swift destruction of the observatory and its occupants.

For heat, they had a Cannon stove burning soft coal. The smoke pipe went through a hole in the ceiling up into the bunkroom, where it elbowed into the chimney, giving the sleeping quarters added warmth. Resembling an old-fashioned railroad-station heater and looking much like that ancient engine of Mount Washington railway fame, the new stove was promptly christened "Peppersass." So efficient was this stove that, with an outside temperature of 15°, it was

easy to run the thermometer up to 115° three feet from the stove and 95° in the farthest corner. The big problem was to keep a lower, steadier, and more healthful temperature, and to lessen the tremendous variations of temperature to which the men were exposed every time they stepped outside.

The study of the formation and nature of frost feathers and rime—frozen droplets of moisture—was one of the minor objects of the group. On 22 October, with a wind velocity of 114 miles an hour, the frostwork on exposed objects had extended to thirty-nine inches in length.

How rapidly winter engulfs the mountain is seen by the fact that on 3 November, three weeks after the cog railway stopped bringing passengers to the summit, four-foot drifts of powdery snow had accumulated in front of the Summit House.[6]

A new member was added to the observatory staff on the first of November when the men were joined by Nanook, an Eskimo sled dog, one of Florence Clark's team on all three of her Mount Washington ascents in 1932. It was a wild drive by auto to the summit with the dog, for the blinding snow cut off all vision. With Al Sise at the wheel, two men on the rear fenders, and Nanook chained in front, they managed to make the grade. Nanook's black body, as he tugged ahead in the center of the road, was a reliable target as the auto crept across the barely discernible Home Stretch Flat.

One difference between this observatory group and the one of 1870 was the type of food served—a striking contrast being found in this 1932 Thanksgiving dinner menu: roast turkey, apple-nut dressing, cranberry sauce, baked potato, figs, dates, fruit pudding, mountain-frozen ice cream and fig pudding!

And here is a tale of Christmas preparations, simply told as a routine part of a winter's work, and yet bordering closely on the tragic. Only thorough knowledge of Mount Washington, unusual experience in winter climbing combined with more than ordinary strength, courage, and will power saved these men from certain destruction. Bob Monahan and McKenzie had gone down the road to meet two men who were bringing two sixty-pound loads of Christmas mail and supplies. They met below tree line near the Jenny Lind Bridge, named in memory of the great prima donna who was so enthralled by the view from this point that it is said she had the carriage wheels blocked while she sang a spontaneous selection. Before the two summit men shouldered their packs and started upwards, they cut and lashed to one of the packboards a five-foot spruce as a Christmas tree.

As the storm grew rapidly more severe, the driving snow and dense fog made visibility almost impossible. On Home Stretch Flat they wandered off the road with a stiff wind at their backs. Realizing that following the easy way of going with the wind would almost certainly cost them their lives, they forced their way against the wind and finally struck the road just as a muffled shot and a dim light showed where Sal Pagliuca was approaching in search of them. The three young scientists reached their summit home at half-past nine, after plowing through a five-foot drift blocking the door, which Sal declared he had shoveled out three times already.

Monahan added: "Our first impressions were a kitchen full of Christmas pies which Sal had baked during our absence and Joe's anxious voice coming over the radiophone."[7]

The winter produced a great mass of information, the meaning of much of which remained to be determined later. That regarding the geological and chemical nature of snow sediment, for example, was later analyzed at Massachusetts Institute of Technology, where there is interest in the collection of atmospheric dirt observed on the arrival of frost storms. Rime, when collected, looks as clean as the sky. When it is thawed, there appears a residue, sometimes red, sometimes gray. Some of the rime from the summit was filtered and the sediment sent to M.I.T. in an attempt to discover the origin of the atmospheric dust.

On 12 April 1933 came the blue snowstorm. The snow fell white, the only storm since November that came without wind. After it had fallen the snow on the summit, as well as that at the Pinkham Notch Camp, and in Exeter, New Hampshire, was found to be blue. When shoveling the snow away from the garage near the summit the men found there, too, to their astonishment, that the snow was blue. Every hole in the snow was filled with blue. Footprints were filled with blue. Pagliuca discovered it; he thought it was a reflection of the sky. But the sky was black with fog. He and McKenzie took a pail of snow into the house and melted it, and the pail was filled with blue. Windows of the observatory plastered with the snow looked like blue stained glass.

It has been suggested that the blue color was caused by quantities of extremely fine volcanic dust that had been swept through the stratosphere, perhaps from as far away as Java, and finally deposited through the medium of a snowstorm.

Shapes of snowflakes told the observers the height of the clouds from which they fell. Snowflakes, of course, can be classified; they have names. It wasn't possible to do much classifying on the summit, for there the flakes were whipped to pieces by the wind.



Weather observatory staff 1932–33, from left: Alexander McKenzie, Robert S. Monahan, Joseph B. Dodge, and Salvatore Pagliuca.



Summit buildings encased in frost.



Frost feathers at the summit.



Taking an observation on tower of weather observatory.

As to why Mount Washington weather is so abnormally severe, Pagliuca[8] commented that the mountain is in a region of frequent storms, where disturbances from the Great Lakes region or from the Gulf of Mexico are likely to converge. Also Mount Washington is near enough to the ocean to feel the effect of the fast-moving, often very severe, coastal storms, and is near enough to Newfoundland to be affected by quasi-stationary storms which are so active there.

The length and severity of storms on Mount Washington are greater partly because of its altitude, but also because of its location at the center of a mountain range stretching from north to south which acts as a barrier to prevailing westerly winds.

At the level of Mount Washington, condensation is very frequent. As a result, moisture being blown up over the upper slopes is cooled and condensed, forming frequent low clouds or cloud caps over the summit. Therefore, fog is frequently experienced at the summit. During 1933 fog was recorded 318 days, or 87 per cent of all days, and in 2600 hours, or 52.5 per cent of all hours.

According to Pagliuca, the rigor of Mount Washington weather is due to the frequent combination of very low temperatures occurring with winds of superhurricane force, often with a smother of snow filling the air. The resulting "cooling power" exceeds that at practically any other place where the climate has been observed.

Wind velocity averages about 40 miles an hour for the year, with frequent prolonged spells of 100 miles per hour, and extremes of 200 miles per hour or over. The total amount of sunshine at the summit is rather limited.

On 30 May 1933 the first year of the second Mount Washington Observatory ended. It was a year rich in scientific research, but richer, perhaps, in the memories of three young men who had the vision of the pioneers and explorers who first made the White Mountains tenantable, and the hardihood of the early settlers who hewed homesteads from forests.

Robert Monahan was recalled to active duty with the United States Forest Service when camps of the Civilian Conservation Corps were being established throughout the White Mountain National Forest in May and June of 1933. At first in charge of the thirty-five-man side camp at Darby Field in Pinkham Notch during the summer of 1933 and superintendent the following winter of the two-hundred-man camp at Wild River, whose territory then included the Presidential Range, he directed much of the initial work undertaken by the CCC in the vicinity of Mount Washington.

After fifteen years with the U. S. Forest Service, he returned to Hanover, New Hampshire, in 1947 as College Forester in charge of the 27,000-acre Dartmouth College Grant in northern Coos County and as Manager of College Outing Properties.

After two years as chief observer on the summit, Salvatore Pagliuca left to take up postgraduate work in meteorology at M.I.T. He became chief observer at the Blue Hill Observatory in 1935. In 1938 he founded the Yankee Network Weather Service and directed it until it was closed in December 1941. After a brief service as district forecaster with the United States Weather Bureau at the East Boston Airport he was commissioned captain in the United States Army Air Forces and in April 1942 assigned to headquarters in Washington in the Weather Directorate. He was promoted to major the following January. He was killed in a jeep accident while in the service of his adopted country on 30 October 1944, while testing weather equipment for the Army Air Force on Mount Mitchell in the Pisga National Forest, North Carolina.

Alex McKenzie continued for four years with the new observatory, becoming radio operator and editor of the *News Bulletin*.

After the successful winter that Messrs. Monahan, McKenzie, and Pagliuca spent on the summit as weather observers, there was no good reason to stop, and there was excellent reason for continuing, for the data then obtained were proving of value in forecasting. This was especially true because they were made immediately available by radio from Joseph Dodge in Pinkham to Albert Sise in Brookline, Massachusetts. Sise soon established a radio station on Blue Hill, in Milton, Massachusetts, through which the reports from Mount Washington could be received directly on the longest regularly used five-meter radio path in the world, 142 miles.

Another important reason for continuing the observatory was radio experimentation in ultra high frequencies, in which Henry S. Shaw and Arthur E. Bent, both of Exeter, New Hampshire, participated.

For the first five years the observatory occupied the stage office. It was during this period, on 12 April 1934, that the greatest blow ever recorded in the world spun the anemometer, perched ten feet above the ridgepole of the Mount Washington Observatory, at the unheard-of rate of 231 miles per hour.

Previous to this anemometers had a habit of blowing away when velocities approached the 150-miles-per-hour speed. Therefore, many scientists doubted the accuracy of the report. But verification of it

came from Dr. Charles F. Brooks, who, in the fall of 1933, became president of the Mount Washington Observatory. His story follows:

The report of the 231 m.p.h. extreme true velocity of wind on Mt. Washington, April 12, 1934, is correct, probably to within 10 m.p.h. The previous maximum observed there was 164 m.p.h. on April 5, 1933. The new high record was made with a rugged anemometer of improved design.

Two men timed the wind on Mount Washington, and I timed it (by radio) at Blue Hill shortly before the maximum, getting 216 m.p.h. for the fastest 0.4 miles. The 231-m.p.h. velocity was for the fastest 0.1 mile, as represented by three 1/30-mile contacts timed by stopwatch. The maximum mile was about 225 m.p.h., the fastest for 5 min. was 188 m.p.h., the fastest for a whole hour was 173 m.p.h., and the average velocity for the fastest 24 hr. was 129 m.p.h., April 11–12. All these figures appear to represent the highest velocity of natural wind ever measured.[9]

Dr. Brooks comments that these velocities do not represent the highest wind that has occurred, and it has been possible to infer from wind effects that velocities exceeding 250 m.p.h., even up to 500 m.p.h., occur in tornadoes. In the opinion of the observers on Mount Washington, this 231-m.p.h. wind did not represent unprecedented conditions, but, owing to mechanical difficulties, it had until this time been impossible to measure winds of such velocity. The record velocity was obtained at a height of ten feet above the top of the observatory building at the top of the steep southeast slope of the mountain, up which the wind came. In the free air it is doubtful whether the velocity exceeded half that on the mountain.

It is pertinent to emphasize the fact that the density of the air on Mt. Washington is only about three-quarters that at sea-level, so that the impact of the 231-mile wind must be discounted to the equivalent of about a 180-mile wind at sea level. Furthermore, when comparing this with hurricane wind pressures, the weight of the flying rain and sea spray on a coast must be placed to the credit of the hurricane's wind pressure. In my opinion, the wind force in the worst West Indian hurricanes equals or exceeds that measured recently on Mt. Washington.[10]

Contrasts between mountain-top and valley wind conditions during the storm are indicated in this news item from Berlin, New Hampshire:

With a reported maximum of 231 miles an hour at the summit of Mount Washington on Thursday, the velocity in the city and surrounding valleys was estimated at about fifty miles per hour by Edward Fenn, Brown Company research laboratory observer.

The upper air disturbances were terrific during that day and had it not

been for the high mountains surrounding the city, it is thought that the wind damage might have resembled a cyclone wreck. As it was no serious damage was reported.[11]

How can one visualize a 231-mile blow? Not by any ordinary standard of known weather. For such winds just don't happen down on the ground. One such wind would reduce any city in the world to a hopeless shambles. That, perhaps, gives some realization of what a super-super hurricane is like and how rugged the buildings on Mount Washington must be to live out such a gale. Two reasons for their survival are these: every building is chained or bolted to the rocks; and during the winter every structure is solidly buttressed with ice and hard-packed snow, adding immeasurably to its sturdiness and to its wind-resistant qualities.

By 1936 the observatory had outgrown its building, and had become too important to continue with informal organization and operation. So in that year the observatory was incorporated in New Hampshire as a scientific institution on a nonprofit basis. And the following year Colonel Henry N. Teague, then president of the Mount Washington Railway, built the present observatory building—known as the "strongest frame building in the United States." To avoid wind damage, extra precautions were taken. Dr. Brooks wrote:

The observatory wants to take no chances of being blown away if another 200-mile-an-hour wind comes along! In . . . [the] 1934 [blow], the stage office danced about as much as its heavy chains would permit, and its walls now and then bellowsed in and out. The pressure inside the building varied between gusts by 0.2 inches on the barometer. This is the equivalent of a change of pressure of a ton on the surface of the building in the course of a few seconds.[12]

For the framework of the building, 9×10-inch railroad beams were used. These beams, twenty-four feet in length, form the trestle-work of the railway. When replaced by new timbers, the old ones were sawed to twenty-two feet and mortised for the new building.

To tie the basal frame of the new building to the mountain-top, ten long bolts were extended downward at least five feet into rock or into huge blocks of concrete poured into holes among the rocks. The corners of this frame were bound with heavy diagonal steel rods. Twelve big uprights, suitably connected by horizontal timbers at the level of the second floor, and all braced by 6×6-inch timbers, formed the frame. The roof rafters were 3×8s closely spaced. Dr. Brooks wrote:

"It is obvious that if the building is to blow away it will have to go as a unit and take a chunk of the top of the mountain with it."[13]

Double plate-glass windows, several of them fitted with thermocouples, have proved their strength and insulating qualities. The walls consisted of a layer of shingles, much overlapped, two layers of boarding, two layers of paper, one layer of Cabot quilting, and one layer of fireproof wallboard.

Heat for the observatory is supplied from a hot-air oil furnace, and water from a 2500-gallon tank inside the building, filled with water from the Base Station by the pump that furnishes water to the Summit House. Most drinking water comes from melting rime over the kitchen stove. Comfortable living and working quarters fill the building to capacity.

Early in the project the United States Weather Bureau became interested, and from 1936 to 1951 furnished about half the observer personnel and much of the scientific equipment. Several hundred individuals joined the observatory as contributing members. Many merchants offered discounts on purchases; the state of New Hampshire, for several years, donated $1200 to $1500 a year, and contracts with several industrial concerns for scientific experiments added to the revenue.

The B. F. Goodrich Company set up an improved design of an airplane wing de-icer boot, and the Quartermaster Corps, the Signal Corps, the Navy Department, the Polaroid Corporation, the Douglas Aircraft Company, the General Electric Company, the Pittsburgh Plate Glass Company, and the S. Morgan Smith Company (wind turbines) have all had individual research projects there.

Research parties from Massachusetts Institute of Technology have used the facilities of the observatory and have loaned apparatus. The Blue Hill Meteorological Observatory of Harvard University supplied the original weather-checking equipment and has since been continuously financing and directing the meteorological research program of the observatory, jointly with the United States Weather Bureau since 1936 and with the Air Force since 1944.

The observatory's development of shielded precipitation gauges, so made that the wind sweep doesn't lead to errors in amount of catch of snow or rain, has been important to correct weather reports from the mountain.

Mount Washington is so located that it gives a picture of storm conditions developing for New England. The observatory staff have watched

storms so long that they know now that if the wind on the summit is blowing from the northwest at 100 miles an hour or more, the lowlands of central and southern New England cannot get a heavy snowstorm, no matter what the other indications are.

This is, of course, merely one of the varied weather facts that have come from studies made on Mount Washington. They are all helpful in the prediction of New England weather, and in forewarning aircraft and shipping of impending storms.

Two natural questions are: what is the purpose of the observatory; and what is its real value? The chief reasons for its existence are the weather observations, the scientific work, and the contributions to public safety. It might be thought that weather observations could be made more comfortably from somewhere else rather than a perch atop the mountain with a reputation for having the world's worst weather. This idea was held until recent years, when speculation turned to questions of what was happening thousands of feet above the earth, and how disturbances in the stratosphere might affect weather in our own cities. So the science of aerology developed, the Weather Bureau and the Armed Forces making daily observations of the upper air by means of airplanes and radiosonde balloons which signalled back the weather by radio from heights even exceeding 50,000 feet. As an addition to these studies, it is valuable to know the weather, wind velocity, temperature, and precipitation on so exposed a spot as Mount Washington where a continuous record (which balloons cannot give) can be kept.

This location, also, is of great importance in radio experimentation. Ultra short waves are affected in certain ways by the height of the station, and it is partly because of this that the observatory has been able to establish new long-distance records with these waves. Then there has developed a series of other experiments, of great value to aviation, that will be spoken of in later chapters.

Men who work hard on a mountain top must eat heartily. One of the paradoxes of life on a frigid peak is that the observatory men never lose their taste for ice cream. The making of it is also one of the wonders of Mount Washington. "All that is necessary is a good swift kick. At a low temperature a slight jar will cause freezing water to crystallize —and presto! ice cream. The crew whip up a batch of cream, place it in the outer entry or in the observation tower to cool. Then the next man who goes by to make an observation just kicks the pan or jar. And the stuff freezes nicely. Tastes good, too."[14]

In the spring of 1949 sweeping changes in the constitution of the

observatory were made, to the end of allowing a wider program of research to be undertaken, and to permit participation in the program of research by colleges and universities and other institutions. The Board of Directors was replaced by a Board of Trustees, not to exceed twenty-seven in number. Five to seven trustees are now elected among persons nominated by the members; the other candidates for the trusteeships to be designated by the presidents of the institutions mentioned above.

Changes among the officers included the election of General Bowen as vice-president, and of Livingston Lansing, Pulaski, New York, as secretary. Dr. Wallace E. Howell of Harvard University was named director of the observatory, Dr. Brooks and Joe Dodge continuing as president and treasurer, respectively. Dr. Howell has become widely known for his work as official rainmaker for the city of New York during a recent severe drought.

Besides the Board of Trustees, there was appointed an Advisory Board of eminent scientists. This board included two geologists, Dr. Marland P. Billings of Harvard and Dr. Richard P. Goldthwait of Ohio State University; Dr. Henry I. Baldwin of the New Hampshire Forestry Department; Stuart K. Harris, Professor of Botany at Boston University; Greenleaf W. Pickard, an expert in radio; and the Harvard astronomer, Dr. Harlow Shapley.

In addition to its purely scientific work, the observatory serves the public in many ways. For example, to promote skiing, and render it more safe, the Weather Bureau's forecasts for the White Mountain area are broadcast twice daily from the observatory. Also, weather and skiing conditions at Cannon Mountain, Fabyan, and Pinkham are obtained for the observatory by radio, and rebroadcast on request. Mount Washington weather is broadcast from the summit every three hours day and night, and twice daily from Boston. The *Boston Globe* publishes the current weather on the mountain. The observatory's broadcasts also aid the Weather Bureau in its storm forecasting.

Safety on the mountain is aided by the observatory's radio and its staff of rugged men, who answer many calls for assistance. For instance, during 1948, these men helped at least seventeen persons in trouble, and with the observatory's effective fire-fighting equipment once saved the Summit House from destruction by fire.

One of the points of interest at the summit of Mount Washington is the "goofers' room" in the observatory, with exhibits, that has been visited by more than 10,000 persons in one summer.

One of the observatory staff states that it is now an accepted fact

that Mount Washington Observatory is the outstanding mountain meteorological research station in the world. Its experimental work has been responsible for the inauguration of the large government research program now in progress, and involving expenditures of $100,000 or more annually in the State of New Hampshire. If it had not been for the observatory's pioneering and the state's financial and moral support, there would probably be nothing on the summit during the winter but snow, frost feathers, and wind.

It is interesting to note that, throughout the history of the observatory, the men who have worked there have received training and experience that have made them outstanding in their later fields of work. A very large proportion of them went directly into, or into work connected with, the armed forces, their wanderings taking them from Hawaii to Syria and from the Antarctic to Alaska and northern Greenland. They are one and all loyal to their "old home" on the summit, and as one of them writes: "The general feeling of these men 'out in the world' is that although the mountain was a four-letter word beginning with 'h' while they were here, it now would be heaven to get back to it."[15]

18. Radio and Television

EARLY in 1936 a group of three Yankee Network engineers took a trip to New York City in order to see and hear for themselves Major Armstrong's remarkable new invention of FM—a fantastic development which was to permit absolutely clear reception of radio programs even with a thunderstorm crashing outside or an electric razor broadcasting its raucous racket in the same room. The party included Albert F. Sise, who was to become engineer in charge of the Mount Washington transmitter, and who had had so much to do with the Weather Bureau and other scientific developments on the summit.

A direct result of this initial experience with FM was the enthusiasm that was passed along to John Shepard III, president of the Yankee Network. He accepted readily the idea that here was the answer to many of radio's most baffling problems. Here was the only means by which a really improved radio service could be provided for the public.

So, in the spring of 1937, the Yankee Network embarked upon a program designed to provide this new FM service to practically all of the rural sections of New England, as well as to the most thickly populated urban centers.

Height is a dominant factor in this new system of radio broadcasting. In FM the frequencies involved are controlled by the quasi theory of line of sight. Or, to put it perhaps more simply, you can broadcast FM to the horizon. Naturally, the high, barren summit of Mount Washington appeared to be a favorable location.

From this point at least 2,000,000 people, mostly in rural areas, could be furnished with satisfactory, interference-free radio service. With their regular radios practically all these people were forced "off

the air" for days at a time because of the topography of the area, dog-day weather, electric storms, and the minor interference of electrical gadgets in the homes of their neighbors.

Of course, one of the most difficult problems the engineers faced in building a station on this exposed peak, 6288 feet above sea level, was the notoriously bad weather. Not only were there serious problems of building a station that would withstand the buffetings of the hurricane-type gales and ice storms, but, they asked, "Will it be possible to maintain a radio station here through the winter?"

Their courage and confidence were confirmed in the fact that, at this bleak and inhospitable arctic outpost, the Yankee Network dared to spend $35,000 in 1937 in the belief that FM held the key to the future of radio broadcasting. Space was rented in the Mount Washington Observatory's brand new building, and the experimental broadcasting station at Squantum, Massachusetts, which operated on the same microwaves that FM would use, was moved to the summit to be housed with its operators in the weather building.

Land was leased from the Mount Washington Railway Company, and the erection of an antenna tower was commenced. This tower was to be ninety feet high and had to be especially designed and braced to withstand the supertornado winds. The hardships encountered in building this tower are difficult to describe.

First, all the materials for building had to be hauled up the eight miles of automobile road by truck or sent up the cog railroad by flat-car. There wasn't even any sand or crushed rock on the summit suitable for concrete. All this was trucked from the city of Berlin, twenty-nine miles away. Concrete stone, which would have cost normally $1.00 to $1.50 per cubic yard on an ordinary construction job, cost $18.00 for each cubic yard by the time it arrived at the summit. Other building materials were proportionally high-priced.

Erection of the massive tower occupied all the possible working days of 1937 and 1938. The tower has four legs and is made of the heaviest steel girders. Each leg is buried in a mass of concrete eight feet square and eight feet deep in the ground. The top fifteen to twenty feet of the mountain is just a huge mass of broken boulders, some of them as large as a house, some much smaller, but all are moved a bit during the years by the heavy frost action. Consequently, deep pits had to be blasted out of this mass for the tower foundations. The holes were finally completed and late one afternoon were prepared for the concrete to be poured the next morning.

But when the morning came, a very heavy overnight rain had filled

the excavations with water. Before they could be pumped out, the water froze. Live steam had to be used to thaw this mass of ice in order to empty the holes and pour the cement. When the structural steel work was started, early fall storms, or sometimes just clouds which often cap the mountain, would deposit a layer of rime over the steel.

Before the erection crew could go to work in the mornings it was often necessary to melt off this accumulation by means of live steam. Because there was no adequate supply of water on the summit, all water for producing steam as well as for concrete mixing had to be brought up the eight-mile auto road by trucks. One morning in October 1937, when the tower was only partly completed, the men awoke to find that a torrent of rain had washed out a good portion of the road, making it necessary to rebuild large sections in order to transport necessary supplies and water to the summit.

The road company worked their crew from the bottom up and the construction crew worked from the top down until they met. This was after the normal season for travel on the road had ended. The steel-erection crew was able to work only six days out of eighteen spent on the summit and then only under exceedingly stormy conditions. And early in November, after the steel crew had risked their lives putting on a large steel plate during a fifty-mile-an-hour gale (the best day in the week), construction had to be halted because of the severity of the weather.

In the meantime, five 2000-gallon storage tanks had been buried in the mountainside about one-eighth of a mile below the summit to provide storage space for 10,000 gallons of gasoline. This was sufficient fuel to run the electric-power-generating plant the six winter months, when both the auto road and the railroad are impassable, and the only method of going up or down the mountain was on foot.

So, during the fall of 1937, radio station W1XER went on the air, with 500 watts power and a temporary antenna. The station was used during the winters of 1937 and 1938 and the early part of 1939 to transmit weather reports from the summit of Mount Washington to the Yankee Network studios in Boston. It also provided the long-sought opportunity to observe how an FM station using the same wavelengths might be expected to perform from such a location. In addition, it provided an opportunity to experiment with different forms of antennas under unusually severe conditions. No one had ever constructed a radio station in such a climate before, and no one knew just what kind of a transmitting antenna system to build.

During the summer of 1938, the remainder of the weird antenna

tower on Mount Washington took form. The radiating elements of the antenna are constructed in the same manner that truck springs are built, except for the fact that they are flat instead of elliptical. These radiating elements are mounted on a pole for their support, so that the over-all result is a four-bay turnstile array. Each of these elements weighs 360 pounds. The steel pole rises thirty feet above the sixty-foot fabricated four-legged steel tower. These springs were chosen as the best available mechanical contrivance that would have the necessary electrical properties of a transmitting array and at the same time would have a chance of surviving Mount Washington's climate, and the howling, screeching hurricanes that blow through the framework of this ninety-foot steel tower.

It may be significant that only one man of the radio station crew, Lafayette Gosselin, of Berlin, expert mechanic and radio technician, continued with the station from 1940 until it closed in 1948.

Besides the weather reports, few if any programs originated from Mount Washington until the foot race in the summer of 1940, which was broadcast from the mountain. By December of that year the Yankee Network had decided to go ahead with the development of an FM transmitter on the summit, and perhaps at some later time to delve into the problems of television.

So, during the summer of 1941, the sturdy and comfortable transmitting station was built. It consists of a two-story building constructed in the shape of a letter L, with a tower room at the angle. The building contains eighteen rooms, including living and sleeping quarters and completely modern cooking equipment. It is capable of accommodating eight or ten men, although the crew was usually not over five. The problems of construction were fantastic, and the costs huge in comparison with those of a similar building in any city.

On the matter of weather, during the period of 1–31 August 1941, while the workmen were building, gales of hurricane velocity kept them indoors for seven days, while for twenty-four days winds of over fifty miles an hour made work impossible. One unacquainted with Mount Washington winds may wonder how they could keep a crew of forty or more able-bodied workmen housed up for an entire month. There is a movie taken on a later day, in winter, by one of the FM station men that explains this. The film shows men coming from the weather bureau on a windy day, and rounding the corner of their building to cross the short stretch of level snow to the radio station. As each man rounded the corner from the lee of the weather bureau, he was promptly knocked flat on the snow by the force of the wind!

An Army man who had been stationed for two years in Greenland was assigned to the weather observatory for the winter. After his life in the Arctic, Mount Washington was just another mountain, until early one afternoon he went out to make a weather observation. At suppertime he was noted as missing, and a searching party was sent out. After some time they located him inching his way up the icy cone of the mountain. While he was making the weather reading, a sudden gust of wind had blown him 500 feet down the mountain!

Not only was construction of the house slowed up by the weather, but the very type of construction had to be highly individualized to meet the requirements of a subarctic winter. Anchored to a concrete basement, which was made an integral part of the summit, the all-steel framework was encased in walls more than nine inches in thickness. These walls consisted of shingles, two thicknesses of sisal-kraft paper laid over creosoted planking, cement blocks, three inches of thermal insulation, Cabot's quilt, and the inside wall finish. At first the walls were built without the shingles or paper, but the building was never tight from wind until they were added.

One thing that slowed up the work of construction more than anything else was the drilling of the well. This was done in the basement of the building so that the water would be piped directly into the radio station building and not be subject to outside cold. Drilling work was begun in June 1941 by two engineers of the Bay State Artesian Well Company, Concord, New Hampshire, and continued all summer. Early in September—after penetrating to a depth of 1080 feet—they struck water. Al Sise, chief engineer of the radio station, reported, enthusiastically: "The water is good, too. It averages about 33 degrees in temperature, it's apparently very soft, and it flows about five gallons a minute."[1]

In the actual drilling, a cold steel drill weighing over a ton was used to sink the six-inch hole over 1000 feet into the heart of the mountain. In operating, the drill and its supporting cable rode up and down assisted by the buoyancy of some 300 feet of water poured into the hole. The rate of drilling averaged about sixteen feet a day.

Right away a difficulty with the well showed up. After the first water, which was very cold, was pumped out, the workmen stopped for a few hours, and when they started the pump again found, to their surprise, that the water was frozen solid. The temperature on the summit was above freezing; what could be the matter? Then it was learned that the mean annual temperature, based on the average of temperatures during the years from 1933 to 1941, at the summit of Mount

Washington was only 26.9 degrees Fahrenheit. At a depth of 200 feet or less the ground was frozen solid ALL THE YEAR ROUND! As a matter of record, the extreme maximum temperature during the period from 1933 to 1943 was 71 degrees; the extreme minimum, −46.5 degrees.

This situation was cured by the use of electric heating which was accomplished by a commercial product called Rockbestos Industrial Heating Cable. By lowering this cable into the six-inch pipe to a depth of 200 feet, the water is kept above the freezing point. The cable dissipates about three kilowatts of power continuously.

In December of 1941, WMNE[2] was operating from its temporary home in the observatory building, using a temporary power of one kilowatt. The broadcasting day began at 6:00 a.m. and continued until 12:00 midnight, seven days a week. The program was picked up by means of FM from WEOD at Boston, and was rebroadcast over WMNE Mount Washington for use in northern New England. By midwinter WMNE was broadcasting from its new home with a substantial increase in power, which resulted in clear, interference-free reception at any distance up to 100 miles or even farther from Mount Washington.

In 1942 the Yankee Network was sold to the General Tire & Rubber Company, and in January 1943 the new owners took control.

To fuel and feed the summit colony, a fleet of trucks was kept constantly busy hauling supplies up the auto road from the time it became usable in the spring until deep snows closed it for the winter.

During World War II radio station WMNE was run continuously to give the signal to New England radio stations to go off the air and maintain radio silence in the event of an air raid.

A winter resident of Mount Washington is continuously subject to hazards. To make climbing more safe, the Yankee Network rebuilt the old Halfway House on the summit road, and erected a new shelter at the six-mile post. In either one a climber can light a fire, and get warmed and dried and rested before pushing on. From there, also, he can communicate by telephone with the summit or the Pinkham Notch Camps to summon aid if needed.

The very important part these shelters play in the winter life of Mount Washington is seen in the experience of two men caught in a storm at the Six-Mile shack, who spent two days there before being able to continue their climb.

An episode in December 1945 illustrates how valuable it may be at times to have more than one building on Mount Washington occupied in winter. During that month such heavy glaze formed that it sealed

the Yankee Network men in their building until the observatory crew chopped the ice off with axes and freed them.

Men on leave during the winter usually ski down the summit road to the Glen. The record is seven minutes, although ten minutes is very fast time. In November 1945 there was a fifty-one-inch snowfall, during which two observatory men got lost, taking seventeen hours and twenty-two hours, respectively, for the trip. At the base they had to "swim" through the drifted snow.

After several years of successful, though highly expensive, experimentation, it was finally decided that it was not commercially profitable to continue radio station WMNE; and in August 1948 it was closed, and the building leased for housing the men working on research connected with de-icing airplane wings and jet engines.

In 1953 a company was formed to establish a television station on the summit to serve all of northern New England. It was later announced that TV station WMTW, Channel 8, would be ready to broadcast early in the fall of 1954. President of Mt. Washington TV was Horace Hildreth, formerly United States Ambassador to Pakistan, Bucknell University president, and Maine governor. The TV studio is in Poland Springs, Maine.

Broadcasting is done by a 100,000-watt machine in what is called "the strongest building in the world." It is constructed of prefabricated panels, thoroughly insulated, the outside being of plywood. These panels are about four feet wide, eight inches thick, and the full height of the one-story flat-roofed building. Panels are bolted securely to the cement foundation and to the roof construction, which is reinforced with balsa wood to withstand any onslaught of ice or wind. Heat generated by the transmitter is far more than sufficient to keep the building comfortably warm. Three diesel engines furnish power.

A microwave screen on the corner of the building facing Poland Springs picks up the broadcast from the studio, and passes it on to the transmitter. The station is serving an area with a radius of somewhere near 100 miles from the summit of Mount Washington.

19. Through World War II

WHOEVER heard of climbing a mountain to win a war? Certainly no such idea entered the minds of the generals and admirals of World War I. At that time our favorite peak became a war casualty. Even the cog railway took its first year-long vacation.

But long before World War II cannonaded into front-page headlines, the Mount Washington Weather Observatory had been sending out reports and setting up records that had caught the attention of scientists, of engineers, and—yes, of military men throughout the country.

Even back in 1881, the mountain's position in the upper air currents was considered of so great assistance in the development of aircraft, that during a five-day period in September 1881 special observations were made of air pressure, temperature, wind velocity, and wind direction in connection with a balloon ascension from Minneapolis.

What was important in 1942 was the fact that on the far-flung battlelines of the world there were spots, like Iceland, Greenland, Alaska, and the Aleutians, where weather was encountered that posed questions of equipment, clothing, food, rusting of metals, icing of airplane wings, and so on, that must be solved quickly. And where could this be done better and more easily than near home where more kinds of bad weather are manufactured than perhaps anywhere else in the world—on Mount Washington? Especially was this true because the observatory was already engaged in such a wide variety of research activities: collecting fog in bottles for M.I.T., studying cosmic rays, the formation of clouds, and the effect of wind on airplane altimeters.

Victor F. Clark, a Harvard meteorologist and veteran observer on

Mount Washington TV station (Channel 8).



Frosted airplane engine in test hangar.



Field-testing soldier equipment at Camp Dodge, Pinkham Notch, for U. S. Army Quartermaster Corps.



Soldier equipment is tested by Army Quartermaster Corps high up on auto road.

the summit as well as with the Weather Bureau, and later staff sergeant in the Air Force in charge of aircraft icing research on Mount Washington, sums up the role of the mountain in this terse sentence: "We at the observatory feel that there must have been few projects other than atomic energy and radar with which the observatory was not connected."[1]

How swiftly Mount Washington enlisted for war is evidenced by the first Army project, in March 1942, when Swarthmore College sent a group of scientists—one a girl—to the summit to test a Swedish primus stove for carbon monoxide fumes. Digging into the snowdrift in front of the Summit House, they set up the primus stove in a small Army tent. The scientists suffered no ill effects from carbon monoxide but on the final night of testing, a hurricane blew down the tent, and the party took refuge in the observatory. Two years later they carried on similar tests, but this time at the Halfway House.

During the summer of 1942 an extremely secret project was undertaken by the National Defense Research Committee for the Navy. This had to do with the penetrability of fog by searchlights.

Next fall came the Goodyear Tire and Rubber Company to test synthetic tires under severe cold. In a comparison of weather records for different parts of the world, Mount Washington was chosen as most satisfactory. Goodyear used dozens of tires mounted on a test car and driven around the parking lot. A few feet of driving usually caused the tires to show up any defects.

As a matter of record, Goodyear found plenty of cold weather in which to test synthetic tires. But once, when the temperature dropped to −45°, the testers refused to venture out.

Winter caught the project with one car and over twenty tires still stranded on the summit. Since they were required to complete the tests, early in January a crew roped the tires together and dragged them to the Halfway House where they were loaded on toboggans and coasted to Pinkham Notch.

Paint stands a terrific beating on Mount Washington. If it is not blasted away in winter, it is usually baked off by the hot spring sun. So it was Mount Washington that the Naval Research Laboratory at Anacostia selected as a site for a winter test of phosphorescent paints.

War projects for the observatory included some interesting tests for General Electric of electric blankets, electric flying suits, boots, gloves, and goggles. One especially enjoyable project was testing the use of sun lamps.

In the fall of 1943, when the Yankee Network personnel had moved to their new building, the observatory staff was increased to six men. At the same time the Army Air Force Eighth Weather Squadron recognized the importance of the Mount Washington Observatory to the Army weather service by adding one of its men to the staff. During the war all weather records were transmitted to the military and civilian weather services in secret cipher.

During the 1943–44 winter the observatory was put on a twenty-four-hour observation basis, instead of the prewar eighteen hours. A special pilot balloon observation shelter was built, and upper-air balloon observations were put on a round-the-clock schedule.

Icing research substations were set up on the summits of Cannon Mountain, New Hampshire, and Mt. Mansfield, Vermont, operated by the respective ski-lift crews, a radio circuit being set up between these stations and Mount Washington.

During the fall of 1943 the United States Army Signal Corps asked the observatory to test the performance of wind-recording instruments that had already seen service in the Arctic. Before the first day of winter arrived, Mount Washington winds virtually destroyed all the test instruments.

During the following winter the Signal Corps, with observatory and Yankee Network co-operation, tested out an automatic weather station. This one was not destroyed, but the winter's supply of heater fuel was exhausted before Christmas. To bring more fuel to the summit required the combined efforts of an Army "weasel" and six prisoners of war from Camp Stark, near Groveton, New Hampshire, who shoveled out drifts ahead of the vehicle.

Again, in the fall of 1943, the National Defense Research Committee, primarily for the Navy, wanted to know more about the fundamental measurements of the amount of light that would pass through various densities of fog. In this case, the University of Michigan, working for the NDRC, secured the co-operation of the observatory. A light was projected through a first-floor window in the observatory, returned by a reflector in a Yankee Network window, and measured in the observatory on its return. A method was developed by research in the observatory to compute fog densities, the computations to be used along with the measurements of light returned.

During the summer of 1945 a project to familiarize several groups of commissioned officers, including one group of nurses, with scientifically designed clothing for cold, wet climates, was undertaken by the Climatic Research Section of the Quartermaster Corps of the Army.

The equipment had been tested previously by ground troops, in part on Mount Washington. The officers bivouacked along the auto road from Cragway to the summit. They found that, although the test was made in summer, all kinds of weather from hurricanes and cloudbursts to ice storms were encountered. The observatory took part in the project by supplying weather forecasts and delivering one lecture on mountain life and weather to each group.

On 22 September, fourteen "guinea pig" Army nurses, all overseas veterans, began the testing of clothing.[2] Their uniforms were the equivalent of the wet-cold uniforms worn by the Fifth Army in Italy.

For several days the nurses lived in oversized pup tents. Their uniforms consisted of layers of insulated wool garments covered by outer clothing of closely woven, wind-resistant, water-repellent cotton fabric. On their feet they wore combat boots covered with rubber overshoes, over two pairs of woolen socks. A cotton field cap and wool-and-leather gloves completed their outfit.

Thus attired, the nurses took daily five-mile hikes over the mountain trails, and attended various classes, starting at 7 a.m. and continuing well into the evening.

The training was directed by Colonel John H. Talbot of Newton, Massachusetts, commanding officer of the research laboratory of the Quartermaster Corps at Lawrence, Massachusetts.

All the nurses had been in service at least seven years. Two of them, Lieutenant Madeline Ullom of O'Neill, Nebraska, and Lieutenant Beulah Greenwalt of Rollo, Missouri, had been prisoners of the Japanese.

During the fall of 1943 the General Electric Research Laboratory (under Army Air Force contract) became interested in doing work at the Mount Washington Observatory. From this contract resulted the most important research to be undertaken on the mountain—the study of precipitation static, which may blot out all radio reception during a snowstorm. This failure of reception is one of the hazards of blind flying. Duplicate experimental equipment was set up on the observatory tower and on an Army B–17 airplane. The Mount Washington tests showed the desired static to be almost always present; but, in addition, frost feathers also formed in almost every case. Since Dr. Irving Langmuir, Associate Director of the General Electric Laboratory and director of the project, felt that the static depended largely on the nature of the surface that the precipitation struck, he was dismayed at first by the complication presented by the ever-present frost feathers on his static-measuring equipment.

Almost immediately he became fascinated by the ice formations—

dazzlingly white frost feathers of a thousand fantastic patterns that have always been the delight as well as wonder of all winter observers on Mount Washington—and sought to learn more about them. But, while mountain dwellers find beauty in these icy formations, to pilots frost feathers can be neither things of beauty nor of scientific interest. For these frosty feathers, building out on the forward edges of wings, or finding their way inside jet engines, form one of the greatest hazards to winter flying. In early days pilots did not intentionally fly through clouds, and so encountered icing only occasionally. But with today's superior equipment for blind flying this situation is changed. And in winter almost every cloud encountered will precipitate ice on a plane. And ice on the wings changes their shape so materially that they will no longer hold the plane aloft.

Already, for several years, the observatory had been conducting aircraft icing research on its own, and had stepped up its activity during the first two war years. But now that Langmuir became interested in the subject the project jumped into big-time operation.

For firsthand information on icing, Dr. Langmuir, in April 1943, climbed through Tuckerman Ravine to the summit to study ice deposits. Victor Clark says:

The calculations resulting from his week's stay at the observatory are a milestone in ice deposit studies, although it was necessary to employ a differential analyzer (robot brain) to work the results into the most usable form, so complicated were the findings. Due to the Air Forces' natural interest in the aircraft icing problem, Langmuir's office at General Electric stepped directly from the static study to icing study for the Air Forces, with Mt. Washington again a natural testing site for these studies.[3]

It was in the spring of 1944 that the B. F. Goodrich Company, leaders in the development of de-icing equipment, made arrangements through the observatory for the installation of an airplane wing section for de-icer tests atop the water tank on the geographical summit. Also a one-room laboratory and tower were built on the side of the water tank, with a ramp running from the tower over the Summit House-Tiptop House passageway, to make the wing more accessible to the observatory.

In the following November a special meeting was called in Washington to co-ordinate the Mount Washington icing work for the best interests of both civilian and military aviation. Next spring, from 19 to 21 June 1945, the Weather Bureau called a Mount Washington Icing

Research Meeting at the Glen House. Twenty-three interested parties attended and much was accomplished in formulating a program for the station and in establishing the Northwest Airlines Ice Research Base project on the mountain.

To add to the observatory's already crowded duties, on 1 January 1945 it began sending out to interested research agencies throughout the country a monthly report of some thirty pages.

Late the following summer the rigors of mountain life were somewhat lightened by the coming of a group of Powers models and photographers getting pictures for *Harper's Bazaar*, which created two days of excitement on the summit.

During the winter of 1944–45 the observatory entertained two Greenland explorers, Dr. J. E. Church, Jr., of the University of Nevada, and S. P. Fergusson of Blue Hill Observatory (both seventy-six years of age), who made the climb and descent over the snow fields through Tuckerman Ravine.

Of interest to skiers that winter was the news that General Electric had hired and put onto the de-icing project the Canadian skiing titleholder, Bob Johannsen, who had escaped from Norway, where he had been researching on ski waxes. GE felt that a good ski wax which kept snow from sticking to skis might also keep ice from sticking to airplanes. However, wax failed to solve the problem.

By the fall of 1945, two more men were added to the observatory staff, one by the observatory and one by the Army. Both Goodrich and General Electric had made plans for greatly increased activities, while Northwest Airlines (under Army contract to do icing research) had been added to the growing list of organizations taking advantage of Mount Washington's notoriously bad weather.

Northwest's previous work had been concentrated on studying the use of heat for protection against ice, all tests being made in flight about Minneapolis. This method proving not nearly satisfactory, they turned to Mount Washington, where half the Tiptop House was winterized to house the increased personnel, and a large platform constructed on the northwest end of the building to supplement the observatory tower for the exposure of research equipment and to accommodate a heated wing section and other equipment.

During all these years the observatory has been aided by use of the laboratory, engineering, and purchasing facilities and personnel of Harvard University. In addition, Harvard's radio station on Blue Hill (originally W1XW, now KAC4) has been the observatory's regular

and practically unfailing contact, over which most of its business with the outer world has been transacted.

To aid Northwest Airlines in setting up their experimental work, an Army B–17 would zoom east biweekly from Minneapolis with supplies and equipment, dip low over the mountain, and land at Berlin airport. Included among the various items that winged their way east were a two-ton electric generator, drums of 100-octane gasoline, and ten miles of Army field telephone wire to connect the summit with the Fabyan railroad station, where calls were then relayed through the Littleton exchange to the outside. The observatory crew took this project on themselves, and laid three miles of the wire down the cog railway track to the base and then along the highway seven miles to Fabyan.

So Mount Washington was developing into the most active icing-research area in the country. As Parker M. Bartlett, of the Navy Bureau of Aeronautics in Washington, suggested: "I think you will see research work on Mount Washington grow more and more important. In the next five years you will see it 'snowball', I firmly believe."

And speaking of snowballs, one of the most spectacular, but less hazardous experiments of the observatory was the manufacture of snowstorms. Through all history, the great fear in farming regions has been drought and its accompaniment of starvation. So there have grown up the various kinds of fake rainmakers and magicians who have grown rich on the credulity of desperate landowners.

Now the scientists have entered the field, and the problem of rain-making seems to be conquered. At any rate, during a severe drought that threatened the water supply of New York City, Dr. Wallace E. Howell, research fellow at Harvard and director of the Mount Washington Observatory, was engaged to produce the needed rain, and the reservoirs were filled.

This result stemmed directly from one of the de-icing studies on Mount Washington—that of clearing the winter sky of clouds by precipitating their moisture in the form of snow. For snow bounces off an airplane and does not freeze upon the wings or in the jet engines.

It was late in 1946 that Vincent J. Schaefer, of the General Electric Research Laboratory in Schenectady, New York, had demonstrated that snow could be produced by "seeding" a cloud with particles of dry ice. On 6 February 1947 the first test on Mount Washington was made. This was almost absurdly simple. The observers held up a piece of dry ice as large as your fist—and it started snowing downward. This

was so successful that a fifty-pound cake of dry ice was ordered. Victor F. Clark lugged it up the mountain on his perspiring back. Next day cumulus clouds blew across the summit and the observatory crew turned out to try snowmaking.

At eleven o'clock that morning, according to Dr. Howell, with the temperature at fourteen degrees below zero, Victor Clark, Ken Gould, then chief weather bureau observer, and Raymond E. Falconer of the observatory staff began the experiment. While photographs of the cloud conditions then prevailing were made, a piece of dry ice about the size of a pack of cigarettes was exposed in the tower of the observatory. As a cloud approached, a foglike mass of tiny ice crystals, formed by the sudden cooling of the air in contact with the cold chemical, was seen to stream from the tower like a cloud of smoke. Instead of dissipating, this cloud thickened as it was carried northeastward by the wind and swept along the east slope of the mountain.

Within two minutes the observers could see a well-developed snow cloud filling the northern end of Pinkham Notch. The visibility, which had been about forty miles when the experiment began, was so reduced by the snow that the mountain range across the notch could not be seen. As a second cloud approached the summit, Clark and Gould held small pieces of dry ice in their mittened hands to supplement the piece still exposed in the tower. So completely was the cloud seeded with ice crystals that it was clearly seen to disintegrate into snow before it had gone a mile past the snowmakers.

The "storm" thus produced deposited a light powder of snow in Pinkham Notch, and on the north and east slopes of the mountain. No wonder that skiers began to speculate how soon it might be before "three inches of new powder snow could be ordered every day for early morning delivery," as Dr. Howell put it.[4]

But of more widespread importance is the help to flying that Vincent Schaefer expects from his snow-making technique. "Just think what it would mean," he says, "if clouds around airports were 'seeded' with dry ice and thus made to clear away." In like manner airlanes might be seeded with dry ice, causing liquid water to turn to snow instead of clinging to wings in the form of rime.

Dr. Schaefer has several schemes for seeding clouds. One is to grind up blocks of dry ice into very small particles. If these were scattered well, the clouds would dry up rapidly. As to the area he could seed and the cost in money and time, the GE researcher asserts: "I could seed an area one thousand feet wide, a mile long, and one thou-

sand feet thick with one hundred pounds of dry ice. Cost of the snow storm in that area would be five dollars; time, ten minutes!"

Another idea which Dr. Schaefer wants to try out is to use bombs, rockets, and other explosives to disperse the dry ice pellets into even greater areas. He also wants to "seed" from captive balloons fastened in or slightly above the cloud to be attacked. It has already been done from a fast-moving plane above Schenectady.

As part of their study of clouds, GE developed a "cloud analyzer," originally designed to measure the liquid water content of clouds. Dr. Schaefer believes that it can be adapted for use in planes. If it shows much liquid water and the temperature is dropping, then bad icing can be expected. If it shows little water, there will be little ice trouble. Men who fly in the Arctic would be glad to have such a device.

This study of clouds, their water content and icing condition, has been going on at the observatory for several years, culminating in the Schaefer snow-producing experiments.

One of the major meteorological inventions on Mount Washington is called a "multicylinder instrument." It was found that an airplane wing is an unsatisfactory—and complex—shape to study. So the staff worked out a system of using cylinders to test the formation of rime. The multicylinder is a series of rotating cylinders of graduated sizes, designed to "sort out" the smaller water drops from the larger ones.

It was expected that the small cylinders would intercept all drops, while the smaller drops would be swept around the larger cylinders by the airstream. The cylinder that built up the most rime would show what size drops were prevalent in the cloud. And that, taken with the total deposit, indicates the kind and severity of icing conditions.

During the winter of 1946–47, Harvard University, under contract with the Air Force, and using the Mount Washington observatory as its base of operations on the mountain, made a close study of the meteorological conditions that lead to icing.

Many of the methods used to compare drop-size computations have been suggested by Dr. Langmuir of the General Electric Research Laboratories, who has taken a great interest in the icing research.

Airplane icing research on Mount Washington actually started back in 1934 when Salvatore Pagliuca began the first experiment of exposing model airplane wing sections on the summit.

Those experiments have proved priceless in starting to pin down exact knowledge about icing. In commenting upon this work of the observatory, Vincent Schaefer has this to say:

The observatory is one of the pioneers in the important field of aircraft icing studies. Some of the basic experimental techniques now in use on experimental planes and icing wind tunnels were originated there. The work of Pagliuca, Arenberg, Clark, and Falconer under the wise leadership of Dr. Brooks and . . . [later] actively continued by the . . . observatory staff under Ken Gould and Wally Howell has been of much importance in this field.[5]

20. The Air Age

ARMY, Navy, and civilian research on Mount Washington, which started during World War II, was going at high speed by the first of 1947. Mountain flying, altimeters affected by sharp drops in temperature, experiments with ice and wind—all came in for attention by the Army Signal Corps to supplement flight research also being conducted atop the peak.

What was going on in 1947 on Mount Washington in the way of icing research was the outgrowth of the establishment in 1942 of the Aeronautical Ice Research Laboratory at Wold-Chamberlain Field, Minneapolis, for the purpose of conducting under icing conditions tests of various types of airplanes employing thermal ice prevention equipment. This refers to planes with heated wings as opposed to "boots" which break off ice. The AIRL found that heated wings and propellors worked well.

In 1946 the Civil Aeronautics Board told manufacturers to get ready to equip all future planes with heat apparatus. At that time there were several kinds being tried, including high frequency and infrared heating. But piping hot engine exhaust gases through hollow sections in the leading edges of the wings appeared to be cheapest and best.

In March 1947 a section of a supersonic wing was mounted on a firm support at the back end of the Tiptop House to test it for icing. Such an airfoil will free itself of ice during top speed by the heat of air friction, but at take-off and landing speeds it will probably ice.

The Mount Washington observatory had already proved that this peak was a natural icing wind tunnel high enough to produce data comparable to flight speeds.[1]

One advantage of the New England Arctic over a plane is that here men can move about safely in a heavy blow and check instruments. No matter how heavily ice is forming, there is never the danger of crashing that faces men flying through clouds.

What the Air Force and Northwest Airlines were trying to learn was: what are icing conditions at the same instant at various levels above the mountain?

In March and April 1947 engineers flew over the summit in a B–24, so that they could make readings at the same instant that other engineers on the summit were making records. They wanted to know whether a newly-formed cloud gives off as bad icing conditions as an old one. The difference between new and old clouds may be a matter of seconds, conditions within the overcast changing rapidly as the wind throws the cloud over and above the peak.

On 23 December 1947 Reg H. Abbott, Mount Washington enthusiast and reporter for the Manchester *New Hampshire Morning Union*, was a passenger on this Liberator bomber as it buzzed the summit, directed by radar.

Pilot of the ship was Captain Frank Horn, Jr., Air Force-Air Materiel Command liaison officer. Another important member of the party was the administrator for Smith, Hinchman and Grylls, Detroit engineering firm conducting icing research on the peak for Northwest Airlines.

Now and then Captain Horn would talk to the Glen House, in Pinkham Notch, the office of the technical director of the Aeronautical Ice Research Laboratory, who was directing the plane in its runs across the summit.

This was no stunt flying. It was a serious effort to determine how flying blind over mountain ranges might be made safe. The first cloud-shrouded run across the mountain had been made in the winter of 1946. Shortly after the 23 December run the same men were to take the same airplane within 100 or 200 feet of the peak in clouds without being able to see a foot ahead of the windshield.

Radar gave them eyes—the radar signal maintained by the permanent AIRL crew in the Tiptop House. It was the only certain "fix" the big ship was to have later when it made runs over the summit on instruments.

In 1946 this Liberator had come within a whisker of knocking off the roof of the Tiptop House in an overcast while the altimeter insisted the plane was flying at 8000 feet over the 6288-foot mountain.

That was when AIRL started one of the nation's most important air

research tests on Mount Washington. The CAA order to all airlines establishing increased minimum distances for aircraft flying over mountainous terrain is believed to have been due at least in part to the discoveries on this mountain.

This job of flying across the summit of Mount Washington in clouds by instruments has always been dangerous. The ship is close to disaster all the time. But it is necessary so that others may fly in safety.

This error in the altimeter reading on the Liberator in 1946 was said to be due to a drop in the barometric pressure because of the "venturi" developed by the funneling of the wind over the peak. This venturi has been a real cause of many mountain airplane crashes, and was the reason why this B-24 research ship nearly "creamed" the summit, even though the altimeter indicated some 8000 feet of altitude. Errors of this kind would be fatal to fliers among the mountains.

The absolute altimeter, a radar apparatus that makes a constant record of the plane's height above the terrain, is of little value in mountain areas. It does not indicate what is ahead. Mountain peaks rise so sharply that before any record is shown the plane has hit the rocks. Also, it is hard to read at heights under 200 feet. The jumping green line changes so rapidly that it is almost impossible to read within fifty-foot accuracy.

Reg Abbott wrote for the *Union*:

> . . . for a moment I am back in a plane over Baffinland . . . we have crossed the Arctic Circle, dropped down over an isolated weather station called Crystal III, and have flown up a fiord to drop mail to waiting men. . . .
>
> Here today we fly by the same snow-covered rocks, treeless arctic terrain, steeply slanting cliffs. It is the same forbidding, yet strangely beautiful land. This is the Arctic just as surely as if it was north of the Circle.
>
> That is why Mount Washington is so important to us. Secrets of flying and living here will help us when we fly, live—and perhaps fight—in the Polar regions.
>
> The work here is that important.[2]

Captain Horn insisted that the study was important, even though plane-builder Howard Hughes had developed a radar warning device for mountain flying. "If we could develop a weather forecasting system which included pressure changes over mountains, special instruments would no longer be needed," said Horn. "It may be that automatic weather stations on the summits of high peaks will be the answer. These instruments could give a continuous check of pressure changes and broadcast the readings at intervals."[3]

A second chapter in aviation history on Mount Washington was written when the skis of a Piper Cub flown by Carmen Onofrio of Berlin, New Hampshire, touched down near the summit on 12 March 1947. Landing on that mountain top had been considered impossible, if not suicidal. But Mr. Onofrio demonstrated with forty-two successful flights that carrying freight and passengers to the top of New England can be practical and safe, at least under certain conditions.

On 24 March 1947 Reg Abbott became the first newspaperman and one of the first ten passengers ever to fly to the summit of Mount Washington. As he expressed it, "This is the way to climb a mountain." As a reporter whose interest in Mount Washington is extensive and unusually keen, he welcomed the oportunity to try the new "elevator service" from the Glen to the Cow Pasture, 1000 feet below the summit.

At the top three men were waiting for Mr. Abbott. They were Jack Goss, supervising engineer of the Northwest Airlines icing research project; George Brock, head of Northwest's work on the mountain; and Ralph J. Hawn, icing research projects engineer for the Air Materiel Command, Army Air Forces, Wright Field, Dayton, Ohio.

Mr. Hawn was the first passenger up that day. By mid-afternoon he was ready to fly down, and Mr. Abbott waited at the Cow Pasture to take some pictures while Onofrio took Ralph Hawn "below." Since the wind was about thirty miles an hour, the pilot aimed for the Great Gulf, rising onto the air and just about falling off the mountain. In fifteen minutes he was back again.

By the way, compare this round-trip time with the "forty-five minutes and several pounds of sweat"[4] that were consumed in tramping the mile from the Cow Pasture to the summit—one way!

Carmen A. Onofrio is an old hand at mountain flying—he has been at it for nineteen years. He calls his charter service "Mountain Washington Airways," and his address is "Berlin Airport, Milan, New Hampshire." But he admits he was a little skeptical when the icing research men suggested his flying pay loads from the Glen to the summit.

I've flown over the peak thousands of times, but never thought I'd land on it. So I thought it over. I saw that carrying equipment in by plane would save the crews packing it on their backs. So I took the ship up there and looked the situation over. They had told me that there might be room to land on the Cow Pasture, and with a strong wind, on the Home Stretch.

I circled over the mountain a dozen times and made three passes at the pasture landing. On one approach I got a little too low on the down side of the mountain and the descending air caught me. So I did a quick left turn

and rode the wind down the mountain, pulling away from it at the same time. But I was carried about 3000 feet down before I could get out of it. Next time I approached closer to the lip of the cliff and landed. It worked.

So I made about 14 landings before I was satisfied that I had the key. By now I was sure it was practical to land on the mountain, so I went back down and took up some loads.[5]

My first landings were at the Cow Pasture at the 7-mile point in an area 50 feet wide and 300 feet long and considerably on a side hill.

The next day I made 14 trips to the top carrying men and material. These landings I made on what is called the "Home Stretch" which is within a few hundred feet of the top and within an area 50×125 feet. I was landing into a 40 m.p.h. wind, which helped to slow down the plane, without which I could not have landed in such a small area. In all I made 42 trips to the top of the mountain.[6]

I'm getting the system of using the air currents. I have used the ascending air on the mountain many times after taking off from the Berlin Airport, in order to gain altitude. I could get the ship up to seven or eight thousand feet in no time. With prevailing northwest wind, I get rising air on the south side of the Great Gulf every time. I have to keep away from air flowing down from Madison and Adams, though.

You know, I've lived around here for years but I never happened to climb the mountain. When I landed on it, it was the first time I'd ever been on top.[7]

It has been said that every record made on Mount Washington depends upon a set of variables which no man can foretell and which may never again occur in the right proportions. Given just the correct combination of human and weather elements, a certain record is both possible and highly probable. So with Mr. Onofrio's forty-two successful flights. Snow, wind, and weather seem to have conspired in his behalf. But on 28 March, when he was called to the Glen House to take a passenger to the top, the snow had been melting. He said he would have a look at the Home Stretch. If this short strip was not suitable he would land at the Cow Pasture, a mile from the summit.

So Onofrio climbed way up, made a couple of passes at the Home Stretch, and came in for a landing. Just before he was ready to level off he saw two rocks in the way. He decided against landing, and pushed the throttle to get away.

His engine coughed, and died.

All he could do then was come in. This he did with considerable skill, doing no damage either to himself or his passenger.

The plane came down hard on one ski, and the impact broke the strut. That dropped the propeller onto the snow, and the blade snapped off. One wing dipped, and the ship veered around.

So Onofrio left the ship tied to the railway for a few days, climbed down the mountain on foot, and went back to his base at Berlin.

As soon as the weather was good again he flew back to the summit in another plane, bringing a new propeller and equipment to fix the broken strut. . . . Pretty soon he had to quit. . . . He had picked up a bad case of the grippe. . . .

After three days he crawled out, sick of the mountain, and wanting nothing more than to get that plane off the summit and go home. He was still not strong, but he couldn't stand it any longer.

So, with the help of the boys from the Yankee Network station and the icing research project, he completed repairs to the plane, shook it free of ice and snow, got it headed into the wind.

It took a while to start the engine, and by the time it was warmed up, the sun had gone down behind the mountains in the west. But Carmen Onofrio was determined to get off that peak that day. And get off he did. By flashlight!

One who saw it said the boys got flashlights and stood at either side of the short runway, holding the lights so Carmen could steer between the lines. . . .

He hesitated but a moment at the end of the runway, then pushed the throttle forward. The ship moved, gathered speed, coughed, then lifted into the air and in a moment was gone, a black shape floating by the men with the flashlights and disappearing into the night.

Alone in the ship he dropped into the gulf; lost altitude; swung out over Pinkham Notch, and flew straight as a homing pigeon to the Berlin Airport.[8]

For another spectacular method of scaling Mount Washington, let's turn to the morning of 15 July 1948, when autoists highballing along Home Stretch suddenly became conscious of a traffic jam. Brakes squealed and necks craned from car windows as settling down gently from a fleckless sky came the first helicopter to visit Mount Washington. This was one of the finest days of the summer, with conditions perfect for Pilot Vinton Smith of Plainville, Connecticut, to set up a new record when he landed an S–51 Sikorsky helicopter near the summit. That he was not seeking a record, but merely carrying on a sales demonstration, detracted not a bit from the excitement caused on the mountain.

His passengers were Lieutenant Colonel J. A. de Vos, O.B.E., Military and Air Attaché at the Legation of the Union of South Africa, in

Washington; Captain L. B. Pearce of the South African Air Force; Ralph G. Carpenter, 2nd, Director of the New Hampshire Fish and Game Commission; and Ray Kuhn, United Aircraft photographer.

According to Edward M. Benham, the purpose of the flight was to demonstrate to the visiting airmen the flight characteristics of the S–51 at altitudes comparable to those at which Captain Pearce would subsequently operate Sikorsky helicopters in South Africa. As Mr. Benham pointed out: "A similar helicopter having established an altitude record of 21,250 feet, it is obvious that the 6000-plus-foot altitude of Mt. Washington was hardly a desperate challenge. The flight, however, did establish another Sikorsky 'first' in that no other helicopter had ever landed near the summit."[9]

Once again, as in the case of the Piper Cub, conditions were exactly right. The flight was made on one of the clearest days of the season, with zero wind movement and a temperature on the summit of approximately sixty degress. The day was cloudless at the beginning of the flight, but a few clouds, just enough for pictorial effect, appeared before the helicopter left the mountain.

This flight started from Rentschler Airport, United Aircraft's private airport at East Hartford, Connecticut. An hour and a half later a stop was made at Wolfeboro, New Hampshire, 147 miles distant, to pick up Mr. Carpenter. From there the helicopter headed directly for Mount Washington, 45 miles away.

Watchers on the summit saw the aircraft approaching along the ridges and watched it settle momentarily on a saddle-back southeast of the summit at about the 5000-foot level. This was done to test the take-off characteristics under full load at that altitude. Pilot Smith then flew the S–51 on several passes around the summit before selecting a landing spot reasonably clear of boulders perhaps 100 feet lower and one-eighth of a mile northeast of the Summit House, and close by the auto road.

After a series of flights for photographic and demonstration purposes, the helicopter dropped down to the Glen House at the foot of the automobile road. Casually, with plenty of time to inspect the terrain on the way down, the helicopter landed in a meadow next to the Glen House within five minutes of its departure from the summit.

After lunch the party flew back to Hartford by way of Wolfeboro without incident. From Hartford the helicopter continued to New York to speed Colonel de Vos on his return to Washington.

Since then Bell Aircraft Corporation has flown to the summit more



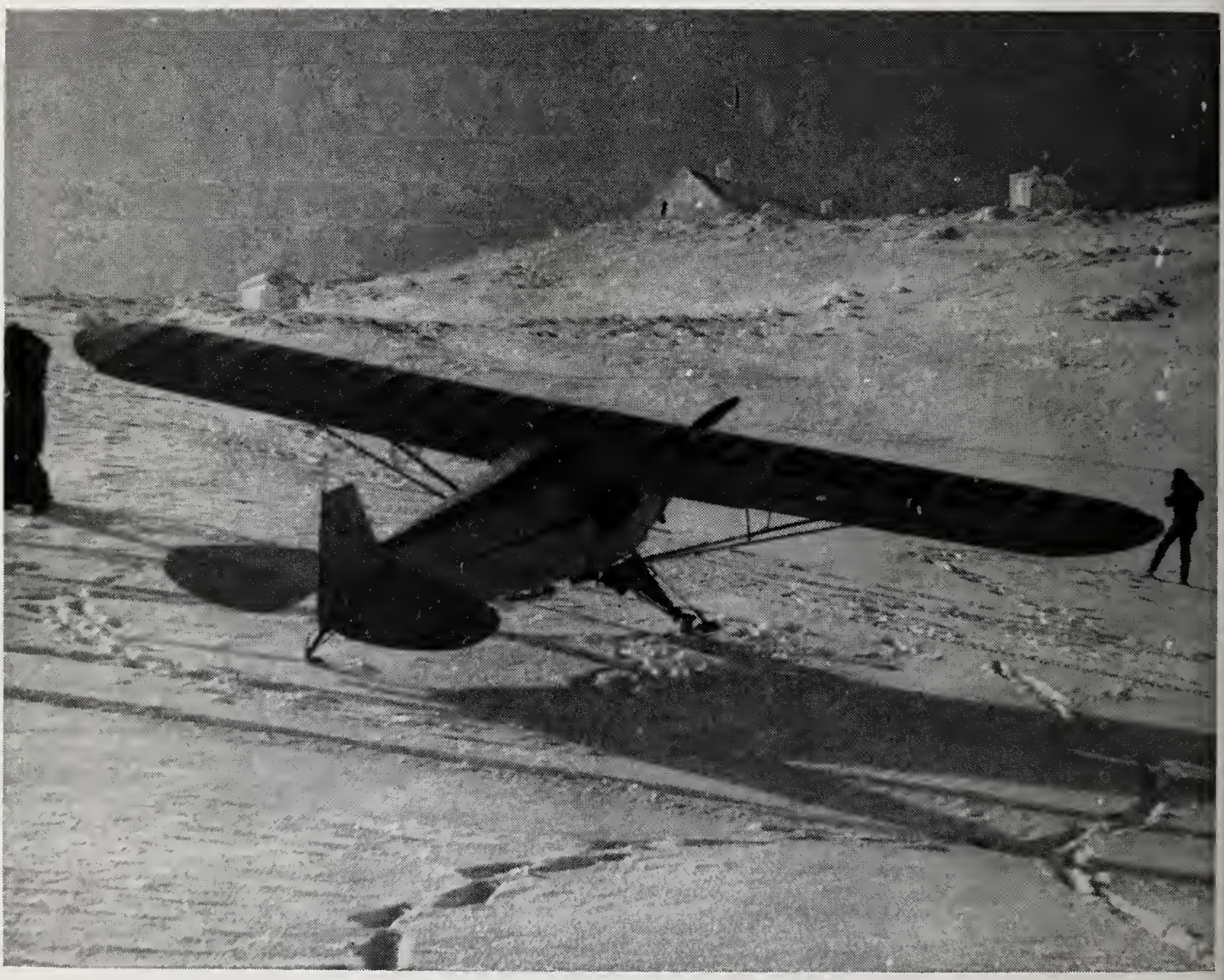
Air Force men arriving at the summit from the eight-mile hike up the auto road.



Army "sno-cat" and "weasel" transport personnel and visiting scientists up the auto road.



Sikorsky s–51 helicopter flying above Yankee Network FM Experimental Radio Station atop Mount Washington.



First airplane (Piper Cub) to land on Mount Washington. Pilot Onofrio of Berlin made forty-two landings on contract with Air Force carrying passengers and materials.

than one helicopter of the type used in air rescue work of the Navy and Air Force—the so-called "battle taxis." And in 1954 the Air Force built a helicopter-test stand on Home Stretch. This is not a landing platform, but a place where a rotor-type aircraft can be lashed to the stand, and tested under every imaginable form of bad weather.

So the Air Age on Mount Washington is not simply a matter of setting up records—spectacular as they may be. It is an outgrowth of those early researches into the icing of airplane wings and of jet engines. This work is of such importance that in 1953 the Air Force commenced the building on Home Stretch of a million-dollar Air Force Climatic Laboratory with a $600,000 dormitory for personnel. With the completion of these buildings in 1956, they, together with the Navy's airplane testing hangar nearer the summit, became a permanent research establishment that can prove increasingly important in insuring flight safety both to the Armed Services and to civilian fliers.

"Project Summit," the title under which all the Mount Washington work of the Air Force is carried on, now assumes a significance which gives the mountain an importance equal to that of any other Air Force research center in the world.

One interesting project has to do with a problem of great timely interest. That is the transport of atomic debris in the atmosphere. In addition to scientific aspects of the question, the public has a natural curiosity about the degree of radioactivity of the material carried in the air.

For the meteorologist the problem has two aspects: (1) how to forecast what will happen to such debris, and (2) what new knowledge of the atmosphere can be gained through study of the actual track of the matter. The observatory has co-operated with the Weather Bureau and the Atomic Energy Commission by acting as one station in a large-scale program of collecting daily samples of radioactive debris during atomic test periods.

The heat source of a nuclear explosion produces a gigantic bubble of hot gases which carries aloft the debris resulting from the explosion, and also draws up huge amounts of soil and dust. The bulk of the material is in the mushroom cap so familiar from photographs, which in most cases reaches the base of the stratosphere. From there it may be carried great distances by the circulation of the atmosphere. This "Fall-Out Project" is reminiscent of the "blue snowstorm" experienced by the observers on Mount Washington during the winter of

1932–33. Radioactive material originating in the Nevada tests often reaches the East Coast.

One of the test projects that bears a direct relation to the health and safety of soldiers, sailors, and airmen is the clothing experiments that are carried on throughout the winter by the United States Army Quartermaster Corps Test Center at Camp Dodge in the Glen, and by the United States Navy Clothing Research and Development Test Center at Halfway House on Mount Washington.

This winter testing of clothing has been done in extremes not found at many other places in the world. Many places have very high winds or below-zero temperatures, but on Mount Washington we have both at the same time. These combined extremes make the mountain a perfect outdoor laboratory for the testing of new types of cold-weather clothing.

One result of this testing has been to upset completely the old idea that to be warm in winter one must wear heavy clothing. For instance, a Navy suit consisting simply of an all-nylon jacket and pants and waffle-weave long underwear is extremely light and durable, and perfectly comfortable even with the thermometer at thirty degrees below zero and the wind hitting a hundred miles an hour.

Another satisfactory suit was developed by the Quartermaster Corps. This "Coldbar" suit is molded from a plastic material resembling sponge rubber. In it men slept on Mount Washington without shelter, and also plunged into deep, icy water with no fear of sinking and without becoming chilled.

During these trials soldiers completed a ten-mile forced march every day, wearing and carrying many of the test items under conditions of extreme dry cold. The purpose of doing this is to establish the merits of, and detect the flaws in, soldier clothing, footwear, packboard, snowshoes, and other materials. The hikes are sometimes to the summit of Mount Washington. Weasels carry the men to the Halfway House, and the men, equipped with full field pack, complete the hike to the summit and return.

This trying out of clothing and equipment on Mount Washington is a rough, gloryless job. But as one soldier who remembered the bitter winter cold of the Bulge, the Nazis' last offensive, put it: "If our making these tests now will keep some poor guy from freezing, I'll tackle Mount Washington every day for as long as I'm needed."

21. In Review

THE story of Mount Washington has unfolded slowly over millions of years. In producing and fashioning the mountain, the Great Sculptor seems to have had a purpose that took time and infinite patience. This mountain was planned to live and to withstand the onslaught of the elements. Through its very bulk and steadfastness it challenges men to overcome their weakness and their fear, and it holds out to men of imagination and courage the key to secrets of nature that can best be secured on this icy, wind-swept summit.

For more than 300 years men have come to the mountain, adding a little to the sum of scientific knowledge, and have passed on, and been nearly forgotten. Those early explorers like Darby Field and Josselyn and Jeremy Belknap fired men's interest in the mountains. Pioneers like the Crawfords, the Copps, and the Willeys wrested homesites from the wilderness, and made it possible for others to ascend Mount Washington in safety.

Where these pioneers struggled with the mountain and its elements, hotels sprang up, flourished, and, in many cases, disappeared, usually through fire. Then came the roads and the railways, and the time of feverish expansion and exploitation. Where a few scores of persons had made their way up Mount Washington by foot or by horse, hundreds came by cog railway and by mountain wagon. So men have come to think of Mount Washington not as a terrible and implacable enemy, but as one that might be overcome—not as an actively hostile foe, but as a sleeping giant on whose recumbent form they might cut a few capers. While men who know Mount Washington best can never forget its menace, still they can enjoy sporting with this enemy, doing their best to make this sport easier and more alluring, and providing for protection against so formidable an adversary.

However, while the Master Builder put Mount Washington there to be fought, to be conquered and, if possible, to be enjoyed, still He must have had a more important purpose in mind when fashioning this tough old pile of rocks. Perhaps today we are learning what that purpose was. It may be mere coincidence, but possibly it was foreordained that Mount Washington should be right there quietly waiting when war and the air age suddenly posed problems that could not be so well and so safely solved anywhere else on earth.

When one forms a mental image of this mountain, it is a picture of the rocky, barren cone from timber line to the summit. All the darkly beautiful forest below is forgotten. For it is the cone, swept by almost continuous winds, and frozen and buffeted throughout the winter, that is now one of the most important laboratories for research into so many problems that have to do with weather, with icing of airplanes, and with food and wearing apparel for the armed services.

It is interesting to note that most of the buildings in the summit colony are functional. Outside of the Summit House, the old Tiptop House and the stage office, every other structure is of a purely scientific nature. The Tiptop House, built in 1853, still links the past and present, spanning a century of continuous use. Other ancient landmarks include the ruins of the original Summit House, built in 1852, which stood about fifty feet directly back of the present Summit House; a horse corral some 300 feet north of the ruins, and a stretch of the old Glen House Bridle Path running from the corral to the Tiptop House. Starting near the observatory is the Crawford Path, built originally in 1819 and improved for horses in 1840, with the remains of a horse corral some 400 or 500 feet below the summit.

A glance at the illustration facing page five discovers a rather astonishing number of scientific establishments. Clustered about the Mount Washington observatory are the television station, the powerhouse, and the former Yankee Network radio transmitter building. Down the long flight of stairs from the Stage Office is the Navy hangar for airplane testing. A quarter of a mile down the automobile road on Home Stretch are located the Air Force Climatic Laboratory, the helicopter test apron, and the dormitory for Air Force personnel.

One of the great difficulties with test work on Mount Washington is the fact that all engines and airplane parts to be tested must be assembled crated, at the Glen House, and transported to the summit in early fall. After that, during the winter, professional engineers from the companies interested in testing come to the Glen. Then the climb-

ing begins for men who are mostly inexperienced in the rigors of Mount Washington weather. For them the Air Force has arranged shelters every half mile along the upper part of the automobile road, with telephone connections in each shelter. If conditions are not too severe, an Army "snow cat" will take the men to the fifth or sixth milepost, while an Army "weasel" often goes down from the summit to pick up passengers at the seventh milepost.

A mysterious-looking object that stood near the fifth milepost of the automobile road for over a year was a robot-controlled weather station, which was fully tested there before being shipped to a bleak deserted Aleutian island. This weather station ran itself, doing the work formerly performed by at least seven men. It was developed by the Signal Corps Engineering Laboratory at Fort Monmouth, New Jersey. Transportable by air, the station consisted of an insulated metal shelter with a small instrument section supported by uprights above the shelter.

Heart of the station was a self-winding clock which acted as the "master-brain." The clock did the same job as a car's starter button, closing the switch to the starter, putting the motor into operation. While the motor was running, the station's batteries were automatically recharged, storing up enough energy for the next start.

Designed to operate without manpower for at least a year before rechecking, the station clicked its Morse-code weather message at fixed times day and night to an Air Force station, perhaps 250 miles away, giving the Air Weather Service of the Air Force measurements on rainfall, sunshine, wind speed and direction, pressure, humidity, and temperature.

So many and so varied are the scientific experiments and studies going on at the Mount Washington observatory that it would require a technical book to enumerate them. For historical purposes it may be sufficient to note that this leading mountain observatory is conducting experiments for, and in connection with, universities, manufacturers, the Weather Bureau, and the Department of Defense.

And so the work on and around Mount Washington goes on. New frontiers in aerological and meteorological knowledge are reached and crossed. Planes today fly more safely through foul weather because of tests and developments worked out on this frigid peak. Soldiers and airmen in Greenland and on the shores of Hudson Bay are more comfortable and more efficient because of the efforts of Quartermaster Corps and Navy test units.

The nature and tempo of the story of Mount Washington has

changed and deepened and become more purposeful. Three hundred years ago, when Darby Field made his historic ascent, the mountain was merely a symbol of fear to the native Indians. One hundred and fifty years later, when the Rosebrooks and Crawfords commenced their pioneering, to climb Mount Washington was still a rugged adventure, one not to be tackled when winter's ice and snow sealed the summit.

It is typical of Mount Washington that the scientific party of 1870–71 were the first to see in this "arctic island" a spot where important weather data might be collected in winter. True, during the thirty years prior to that visit, the mountain had become increasingly important commercially and as a summer resort. Since the late 1920s its summer use by climbers and sportsmen has increased tenfold. Every winter sees increasing numbers of skiers in Tuckerman Ravine.

But it is to the scientists that Mount Washington is most indebted for becoming a busy year-round laboratory wherein are explored the secrets of cosmic rays, of droplets of water, of clouds, of neutron counts, of fog dispersal, and of many other natural phenomena.

Those of us who can look back to those "good old days" of the big Summit House with its spacious parlor, its ample, well-stocked dining room, its broad lobby with the fat round-bellied stove around which gathered at evening a group of reminiscing old-timers and genial hosts, still feel a tug within when we visit the busy, bustling little modern Summit House, and poke about among the mysterious and none-too-friendly-looking new buildings. But we know that inherently today is better than yesterday on Mount Washington, and tomorrow may be even better. For under the careful stewardship of Dartmouth College—which has had some interest in the mountain ever since 1821—and with the wise guidance of the observatory staff, and the inquiring perseverance of the scientists, weather observers, soldiers, sailors, airmen, and television personnel who man the projects for various companies and armed services, this mountain is becoming year after year more and more important to the United States of America.

Notes

Notes

CHAPTER 1

1 The "first full, precise, and detailed account of an ascent . . . still reckoned difficult" was given by Dompjulian de Beaupre, Captain of Montélimar, Chamberlain to Charles VIII, King of France. In 1492, on orders from the King, de Beaupre and party climbed Mont Aiguille in Dauphiné, near Grenoble, and spent several days on top of this Mont Inaccessible. See Francis H. Gribble, *The Early Mountaineers*(London, 1899), p. 28.

2 Benjamin G. Willey, *History of the White Mountains* (Boston, 1870), p. 281.

3 Charles T. Jackson, *Final Report on the Geology and Mineralogy of the State of New Hampshire* (Concord, 1844), p. 78.

4 C. H. Hitchcock, "Existence of Glacial Action Upon the Summit of Mt. Washington, New Hampshire," *American Association for the Advancement of Science Proceedings* 24: 92–96 (1876).

Dr. Charles H. Hitchcock, Professor of Geology at Dartmouth, was appointed State Geologist of New Hampshire in 1868 after having served as Assistant State Geologist of Vermont and State Geologist of Maine. He was son and pupil of the eminent Professor and President Edward Hitchcock of Amherst College, who had ascended Mount Washington in 1841 to study glacial-aqueous action.

5 Ernst Antevs, *Alpine Zone of Mt. Washington Range* (Auburn, Maine, 1932), p. 6.

6 The following geological data are from Marland P. Billings, Katherine Fowler-Billings, Carleton A. Chapman, Randolph W. Chapman, and Richard P. Goldthwait, *The Geology of the Mt. Washington Quadrangle of New Hampshire* (Concord, 1946). See also Goldthwait, *Geology of the Presidential Range* (New Hampshire Academy of Science, Bulletin No. 1, 1940).

7 Billings et al., supra, p. 34.

8 "An Unknown Novelty," *White Mountain Echo* 9 July 1892.

CHAPTER 2

1 Samuel Adams Drake (*The Heart of the White Mountains, Their Legend and Scenery*, New York, 1882, p. 120 n.) says: "The only Indian name for

the White Hills that bears internal evidence of genuineness is one given on the authority of President Alden . . . that is, Waumbekketmethna."

Timothy Alden wrote: "I have lately been informed that the *White Hills* were called by one of the eastern tribes, I cannot ascertain which, *Waumbekketmethna*. I have spelt it, as I think all aboriginal names ought to be, as pronounced. *Waumbekket* signifies white and *methna*, mountains, as I am told." From letter dated 1806 from the Reverend Timothy Alden (founder and president of Allegheny College) to the corresponding secretary of the Massachusetts Historical Society, published in the *Collections* of the Society (Boston, 1814; reprinted Boston, 1846), II, 266, 267.

Waumbek Methna, or the shorter form "Waumbek," has been given various fanciful interpretations, such as "Mountains with Snowy Foreheads." Outside of poetry or legend, Waumbek alone of Indian names for Mount Washington has been preserved, both in the Waumbek Tank, the water tank one mile above the Base Station of the Mount Washington Railway, and in the Waumbek Hotel at Jefferson, N. H.

The Reverend Benjamin G. Willey (*Incidents in White Mountain History*, Boston, 1856, p. 14) mentions another alleged Indian name for Mount Washington. It is the harsh-sounding phrase, "Kan Ran Vugarty," said to mean "the continued likeness of a gull."

All these names refer to the white appearance of the summits in the Presidential Range, not alone because of their crown of snow during more than half of the year, but also because of the gleaming nature of the bare rocks in summer.

Still another name for the mountain has been found by the Honorable John G. Crawford. His study of Abnakis, an extremely simple language, discloses two words for mountain. One is "Wajos," or "Wachos," from which comes an Abnaki name for Mount Washington, "Kodaak-wajo," the hidden mountain, so called because the top was so much hidden by clouds. For the White Mountains, the Abnakis had the name "Wajobadenik" (John G. Crawford, *Indians of New Hampshire*, paper read before the Manchester Historical Association 17 March 1897, pp. 183–185).

Apparently the first name given to the mountain by white men was that of "the Christall Hill." This was applied either to the highest peak or to the main range by Christopher Levett, the pioneer colonist in Casco Bay, in his account of his voyage to New England, published in 1628, in which he says (p. 20), "A great mountain to the west [is] called the Crystal Hill." Of the "Sawco" (Saco) River he says: "I am told by the Salvages [*sic*], [it] cometh from a great mountaine called the Christall hill" (*ibid.*, p. 20). In more recent years the name has been used poetically as "Crystal Hills."

2 John Winthrop, *History of New England from 1630 to 1649*, printed from the original manuscript written by Governor Winthrop, with notes by James Savage (Boston, 1826), II, 67, 68, 89. Despite Winthrop calling Darby

Field "an Irishman," a long line of Fields who claim him as ancestor declare that he was English, born in Boston, Lincolnshire, England, about 1610, son of John and Ellen (Hutchinson) Field, as is recorded in Frederick C. Pierce, *Field Genealogy* (Chicago, 1901), II, 949. The names "Darby" and "Field" are well known in England, and are said to be rarely found in Ireland.

Darby Field came to Boston, Mass., in 1636, and lived at Oyster River, N. H., where he owned a beautiful estate, the site of which has been definitely located. In 1638 he moved to Exeter. With other settlers he signed, in 1639, the "Exeter Combination," an agreement for governmental purposes, drawn by their pastor, though not implying church membership. He moved in 1648 to Dover, N. H., where he died in 1649, leaving a widow, and it is said, children. A. H. Quint, *New England Genealogical Register*, VI (Boston, 1852), 38.

3 Jacob Bigelow, "Some Account of the White Mountains of New Hampshire," *New England Journal of Medicine and Surgery* 5:321 ff. (November 1816).

4 Edward Tuckerman, "History of the Exploration of the White Hills," in Thomas Starr King, *The White Hills, Their Legends, Landscape and Poetry* (Boston, 1860), p. 37.

5 John Josselyn, *New England's Rarities Discovered in Birds, Beasts, Fishes, Serpents, and Plants of that Country* (London, 1672), reprinted with notes by Edward Tuckerman (Boston, 1865), pp. 35–37. The Josselyn brothers were sons of Sir Thomas Josselyn, Kt., of Kent, England. Henry settled at Piscataqua as early as 1634. From 1636 he was a member of the council of Sir Ferdinando Gorges' province, and a part of the time deputy governor. John Josselyn, *An Account of two Voyages to New England made during the years 1638, 1663* (London, 1674), reprinted with notes by Edward Tuckerman (Boston, 1865), p. 48.

6 Jeremy Belknap, *The History of New Hampshire*, III (Boston, 1792), 46.

7 A. N. Somers, *History of Lancaster, New Hampshire* (Concord, N. H., 1899), pp. 317, 318.

8 John Wentworth to Jeremy Belknap, letter of 18 November 1774, quoted in Frederick Tuckerman, "Early Visits to the White Mountains," *Appalachia* 15:122–123 (August 1921), quoted from Massachusetts Historical Collections (6), 4:64, 65. John Wentworth, who graduated from Harvard College in 1755, a classmate of John Adams, second President of the United States, was a nephew of Governor Benning Wentworth, whom he succeeded in 1767. An ardent Tory and the last of the royal governors, Governor John remained in office till the outbreak of the Revolution in 1775. He was afterwards appointed lieutenant-governor of Nova Scotia, and in 1795 was created a baronet.

9 Albert Stillman Batchellor, ed., "Grants of New Hampshire Territory by the Governor of Massachusetts," *Town Charters,* vol. I, in *State Papers of New Hampshire* (Concord, 1894), XXIV, 529, 530.

10 History appears to be uncertain about her surname. Frank H. Burt, *Among the White Mountains* (Mt. Washington, 1886), gives it as Barton. The same surname is given by J. M. Cooper in an article on "Jefferson," *Granite Monthly* 25:63 (August 1898). *The White Mountain and Winnepissiogee Lake Guide Book* (1848), p. 40, makes it Rogers and even gives the name of the treacherous lover as Jim Swindell (!). See also Frederick W. Kilbourne, *Chronicles of the White Mountains* (Boston and New York, 1916), p. 55 n.

Lucy Crawford, *The History of the White Mountains, from the First Settlement of Upper Coos and Pequaket*, 2nd ed., Henry Wheelock Ripley, ed. (Portland, Me., 1886), p. 106. The present author feels that Lucy Crawford's version of Nancy's fate is the most reliable source for the facts of this tragedy. Timothy Dwight, *Travels in New England and New York* (New Haven, 1821), II, 153, gives a short but excellent account of the tragedy, but places the date as 1782, which may be a little late.

Chester B. Jordan, "Joseph Whipple," *Proceedings of the New Hampshire Historical Society* 2:289–319.

11 The Reverend Jeremy Belknap, D.D. (1744–1798), born in Boston, was minister of the Congregational Church, Dover, N. H. (1767–1787), and for ten years of the Federal Street Church, Boston. He was an intimate friend of the last royal governor of New Hampshire, Sir John Wentworth.

12 Belknap, *History*, III, 48.

13 Doctor Belknap's journal of the expedition was printed by the Massachusetts Historical Society in 1876. A further account by him was published by the American Philosophical Society in Philadelphia.

14 Manasseh Cutler (1744–1823) was born in Killingly, Conn. A graduate of Yale, he organized the Ohio Company, receiving a grant of 1,500,000 acres from Congress and founding the city of Marietta in 1788. He is said to have made the first draft of the Ordinance of 1787 for the government of the Northwest Territory. Doctor Cutler's journal of the trip to the White Mountains is included in his *Life, Journals and Correspondence* (Cincinnati, 1888).

15 A long account of the trip written by Mr. Little, and left in the archives of his church, the First Parish of Kennebunk, Me., was found by Reverend Daniel M. Wilson, (pastor from 1909 to 1916) and printed with comments in the *Boston Herald* (date unknown).

16 *Ibid.*

17 Belknap, *History*, III, 49 and note.

18 These "eastern counties" included what are now parts of New Hampshire and Maine, then belonging to Massachusetts.

19 Belknap, *History*, III, 41. The most conclusive evidence that the mountain was named by the Belknap party, however, is found in Doctor Cutler's excellent account of the journey, written in 1784, in which is found the name of Mount Washington. This was, without doubt, the first time the name appeared in any manuscript. *Ibid.*, III, 43 n.

20 This land is now partly occupied by the Mount Washington Hotel golf course.

21 "In those days it was customary when a frame was raised to give it a name, and it was generally contended that the ridgepole would not stick without what was called wetting, the meaning of which was the wetting of the throats, first, of those who pronounced the name, then of all present with something stronger than water.

". . . [When Amos Eastman of Conway raised a second story on his old home, in 1822, the 'wetting' was led by a] sailor-boy (from Falmouth, England, who was connected with the family by marriage,) [who] stood erect on the western end of the frame with bottle in hand, ready to reply to the stentorian interrogation by one standing on the extreme east end, as follows: 'Here is a good frame and what shall we call it?' The sailor boy in a loud, clear and musical tone of voice replied:

'Here is a good frame; it is double sol'd,
One-half is new, the other is old;
The owner is honest, and steady's a gig,
All that he needs is a wife, cow and pig.'

'Will that do, gentlemen?'

"After three hearty cheers by the throng, the sailor boy walks the length of the ridge-pole to his interrogator, and after wetting their lips he returns . . . [making sure at each step that the ridgepole was firm]. This entire program was repeated three times with cheers. The sailor boy, Henry Tucker, then declares the frame to be good, square, plumb and complete; suitable, when covered in, for a father, mother and children to live in. Then followed rousing cheers for the frame, for the owner, and for the sailor boy who then tossed high in the air the well corked flagon, which falls safe and unbroken in the main road, just where we quicken the horses after rising the hill from the bridge across the mill stream." Benjamin D. Eastman, *North Conway, Its Surroundings, Its Settlement by English People* (North Conway, articles reprinted from *The Idler*, 1880), pp. 10, 11.

22 Crawford, *History*, p. 26.

23 *Ibid.*, p. 40.

24 John Brazer, A.B., Harvard 1813; tutor 1815–17; Professor of Latin, 1817; minister Unitarian Church, Salem, Mass., 1820–46. Died 1846 at the home of a classmate at Charleston, S. C.

25 This and two following quotations, Crawford, *History*, pp. 41, 42.

26 *Ibid.*, p. 45.

27 Prominent members of the Harvard class of 1817 included: George Bancroft, A.M., PH.D., etc.: Tutor, Overseer; Secretary of the Navy; U. S. Minister Plenipotentiary to Great Britain, Prussia, Germany; honored all over the world by membership in honorary scientific societies. George Storer Bulfinch: architect. Caleb Cushing, LL.D.: Tutor, Overseer; Justice, Supreme Judicial Court of Massachusetts; Attorney General of the United States; Member of Congress; U. S. Commissioner to conclude peace with China; U. S. Minister Plenipotentiary to China, Spain; Fellow, American Academy of Arts and Sciences. Samuel Atkins Eliot: Treasurer of Harvard; Member of Congress; Fellow, American Academy of Arts and Sciences; father of President Charles W. Eliot of Harvard. George Barrell Emerson, A.M., LL.D.: Tutor; Fellow, American Academy of Arts and Sciences. Samuel Joseph May: famous minister. Alva Woods, A.M., S.T.D.: Professor of Mathematics and Natural Philosophy, Columbian (D. C.) and Brown Universities; President of Transylvania University (Kentucky) and University of Alabama.

28 Much of the following data comes from Frank H. Burt, "The Nomenclature of the White Mountains," *Appalachia* 13:359 ff. (December 1915), and "The Nomenclature of the White Mountains, II," *Appalachia* 14:261 ff. (June 1918).

Belknap (*History*, III, 41) quotes from a paper by his friend Dr. Cutler: "At the base of the summit of Mount Washington the limits of vegetation may with propriety be fixed," indicating that the name had already received recognition. The preface to Belknap's third volume is dated 23 April 1792. His own map of New Hampshire, published with the second volume of his *History* in 1791, bunches the Presidential Range as one mass marked "White Mountains." Evidently the mountain was named late in 1791 or early in 1792, and it is fair to presume that the name was proposed by Dr. Belknap and the companions of his mountain journey.

The first map giving the name of Mount Washington, so far as known, is D. F. Sotzmann's Map of New Hampshire (Hamburg, Germany, 1796). The name does not appear on the maps of either Lewis or Carrigain.

29 Called "Mt. Quincy," in Theodore Dwight, Jr., *Northern Traveller* (New York, 1831), pp. 346, 353.

30 Called "Mount Pleasant," or "Dome Mountain," in "Sketches of the White Mountains," in John Farmer and Jacob B. Moore, *Collections Historical and Misselaneous* (Concord, N. H., 1823), II, 98. Called "Pleasant Dome" on maps of United States Geological Survey (1893 and later). Called "Mt. Prospect" by James Pierce, "Excursions among the White Mountains of New Hampshire, and to the summit of Mount Washington, in June, 1823," *American Journal of Science* 8:175 (1824), and in Dwight, *Northern Traveller* (ed. of 1834), p. 304.

31 Mount Webster, which forms the northern rampart of Crawford

Notch, was formerly known as "Notch Mountain." According to Frank H. Burt, "Nomenclature," *Appalachia* 13:386, the present name was given by Oakes as early as 1848, and was shown on the *Map of the White Mountains of New Hampshire*, by Professor George P. Bond of Harvard College (1853). "Professor C. H. Hitchcock states that it is probable that the name of Mount Webster was proposed by Mr. Sidney Willard" (for whom, he says, Mount Willard is named) (Kilbourne, *Chronicles*, p. 113n).

32 Abel Crawford called it "Bald Hill." Named as early as 1837 for DeWitt Clinton, chief promoter of the Erie Canal, United States Senator, Mayor of New York City for ten years, and Governor of New York State for nine years. In April 1913 the New Hampshire Legislature passed an Act changing the name "Clinton" to "Pierce," to honor President Franklin Pierce, but the new name has never been used (Chapter 96, Acts of 1913, Approved by the Governor 22 April 1913).

33 Mount Jackson was named by William Oakes as early as 1848, to honor Dr. Charles T. Jackson, first State Geologist of New Hampshire, whose geological survey of the state appeared in 1844. He is also known to the medical world for his valuable discoveries in etherization. Joseph Garland, *The Story of Medicine* (Boston, 1949), p. 157.

34 Charles G. Washburn, *The Life of John W. Weeks* (Boston, 1928), pp. 3, 4.

35 Tuckerman, "Gleanings from Visitors' Albums," *Appalachia* 14:371 (June 1919); see also James W. Weeks, *History of Coos County, New Hampshire* (Syracuse, N. Y., 1888), p. 54.

36 This and four following quotations are from Crawford, *History*, pp. 45–47. See also *New Hampshire Historical Collections*, 1823; Farmer and Moore, *Collections*, II, 97–107.

37 Sweetser, *White Mountains*, p. 212. Farmer and Moore, *Collections*, II, 98.

38 There have been so many speculations as to the height of Mount Washington, that it may be interesting to record various calculations that have been made.

1784: Manasseh Cutler, of the Belknap-Cutler expedition, estimated the height to be at least 10,000 feet, although in his journal he mentions 9000 feet.

1804: Dr. Nathaniel Bowditch (from barometric observations by Professor W. D. Peck) estimated the height to be 7055 feet.

1804: Captain Alden Partridge (by barometric readings) estimated the height at 6103 feet. See his article, "Altitudes of Mountains in the States of New York, New Hampshire, and Vermont," *Transactions of the American Philosophical Society* (2), 1:149 (1811).

1807: Dr. George C. Shattuck of Boston, recent graduate of Dartmouth College, afterwards president of the Massachusetts Medical Society, wrote:

"at 12 o'clock, on the 12th of July . . . The geometrical admeasurements, calculated from our observations, gives to Mount Washington an elevation of 4620 feet above the champaign in front of Mr. Rosebrook's . . . This being added to 1648, the barometrical height of Rosebrook's above the sea, will give a total of 6268." *Philadelphia Medical & Physical Journal* 3: part 1, pp. 26–35. ("Some Account of the Excursion to the White-Hills of New Hampshire, in the year 1807." In a letter dated 28 August 1807 to the editor, from George Shattuk [*sic*], M.D. of Boston.)

1816: Dr. Jacob Bigelow (from barometer and thermometer readings compared with observations at Cambridge, Mass.) calculated the height as 6225 feet.

1816: William Maclure, using geometrical calculations, determined the height at 6265 feet.

1820: The Weeks-Brackett-Stuart party calculated the height as 6428 feet.

1821: Captain Alden Partridge (by barometrical observations) raised his estimate of 1804 to 6234 feet (see Ref. No. 45, p. 178).

1840: Dr. Charles T. Jackson, State Geologist (by barometer and thermometer) estimated the height to be 6226 feet. He was quite accurate as to the difference between the altitudes of Mount Washington and the Notch, and by correcting an error in the height of the Notch, his figure for the mountain would be 6303 feet.

1851: Professor Arnold Guyot (from barometrical observations) reached the figure of 6291 feet.

1861: In his memoir on the "Appalachian Mountain System," Guyot altered his figure to 6288 feet, the accepted height.

1853: Captain T. J. Cram, under direction of the United States Coast Survey, reported the height to be 6293 feet.

1853: William A. Goodwin (engineer for the Atlantic & St. Lawrence Railway) surveyed from Portland to the summit, calculating the height to be 6285 feet.

1854: R. C. Ricker and Charles H. V. Cavis, in surveying for the carriage road, reported the height of the mountain to be 6284 feet.

39 See Tuckerman, "Gleanings," *Appalachia* 14:372, n. 2 (June 1919).

40 This and the three following quotations from Crawford, *History*, pp. 49, 51, 52.

41 Tuckerman, "Gleanings," 14:376, n. 4.

42 This and two following quotations from Crawford, *History*, pp. 87, 88.

43 *Ibid.*, p. 54. They were the daughters of Reverend Daniel Austin, a Unitarian minister, originally from Massachusetts, who bought Colonel Whipple's place in Jefferson, N. H. (Weeks, *History of Coos County*, p. 420). Eliza married Stuart on 4 July 1822. He died in 1837, at the age of forty-

six. He was a graduate of Dartmouth in 1809. (Somers, *Lancaster*, pp. 192, 194, 463, 487). *History of Coos* gives name as *Stuart.*

44 Crawford, *History*, p. 55.

45 Frank H. Burt, "The Story of Mount Washington," North Conway *Reporter* 5 December 1941.

46 James Pierce, "Notice of an excursion among the White Mountains of New Hampshire, and to the summit of Mount Washington, in June, 1823, with miscellaneous remarks," *American Journal of Science* 8:172–181, August 1824.

47 Crawford, *History*, pp. 60, 61.

48 *Ibid.*, p. 57.

49 *Ibid.*, p. 71. Tuckerman also reported "a somewhat capacious spring, which was well known there before the putting-up of the house on the summit." Josselyn, *New England's Rarities*, p. 37.

There is something mysterious about this spring. I have found nobody who recalls it. Yet one of my earliest recollections of Mount Washington is drinking many times from a never-failing spring of clear, cold water, located some distance to the south of the front corner of the old Tiptop House, the only one of the original buildings still standing. Nathaniel Noyes, proprietor of the original Summit House, told the Reverend Benjamin Willey that, "A living spring of delicious water, about thirty rods below the house, on the northern side of the summit, supplies water abundantly" (Willey, *Incidents*, p. 298).

50 *Ibid.*, p. 80.

51 *Ibid.*, pp. 83, 84.

52 *Ibid.*, p. 85.

53 *Ibid.*, p. 70.

54 *Ibid.*, pp. 68, 69.

55 *Ibid.*, p. 74.

56 John H. Spaulding, *Historical Relics of the White Mountains* (Mt. Washington, 1862), p. 55.

57 Willey, *Incidents*, p. 111. A family named Pendexter came to live in the Willey House the year after the slide. They experienced one storm almost as frightful as the historic tempest, though they suffered no harm. In 1845 Horace Fabyan bought the place and built a hotel close to the old house. On 24 September 1899 the two buildings were destroyed by fire. The place lay vacant until New Hampshire acquired the entire Notch as a State Reservation. After that the Willey Log Cabins were built.

58 Crawford, *History*, p. 92.

59 Carlos Wilcox (1794–1827), letter in Portland *Eastern Argus* 12 September 1826. He was a brilliant Congregational clergyman, graduate of Middlebury College and Andover Theological Seminary; author of *The Age of Benevolence* and other poems.

60 Willey, *Incidents*, pp. 116–118.

61 Wilcox, letter.

62 Crawford, *History*, p. 95.

63 Wilcox, letter.

64 Crawford, *History*, p. 95.

65 Benjamin Durgin Eastman (1802–81) was a Methodist clergyman 1831–57, serving parishes in Maine and New Hampshire. Represented Sweden, Me., in both the House of Representatives and State Senate. Later he conducted a store in North Conway and acted as postmaster. His story of the Willey disaster is of great help in reproducing the exact conditions found by the searchers, and in confirming Melcher's statement, made also in 1880.

66 Eastman, *North Conway*, pp. 25–27; Willey, *Incidents*, pp. 130–132; Edward Melcher, *A Sketch of the Destruction of the Willey Family by the White Mountain Slide on the Night of August 28, 1826* (Lancaster, N. H., 1880).

67 Eastman, *North Conway*, p. 25.

CHAPTER 3

1 Crawford, *History*, p. 101.

2 This and the following quotation from Crawford, *History*, pp. 115, 116.

3 *Ibid.*, p. 126.

4 *Ibid.*, p. 140, 141.

5 Frances Trollope, *Domestic Manners of the Americans*, quoted in Tuckerman, "Gleanings," *Appalachia* 14:378.

6 Anthony Trollope, *North America* (London, 1862), p. 35.

7 Anecdotes of Ethan Allen Crawford, "King of the White Mountains," as related by James W. Weeks in *History of Coos County*, p. 443.

8 Crawford, *History*, p. 140.

9 *Ibid.*, p. 140.

10 *Ibid.*, p. 140.

11 Edward Waldo Emerson and Waldo Emerson Forbes, eds., *Journals of Ralph Waldo Emerson* (Boston, 1909), p. 492.

12 Kilbourne, *Chronicles*, pp. 141–143.

13 *Ibid.*, p. 116.

14 Harriet Martineau, *Retrospect of Western Travel* (London, 1838), II, 111.

15 Harriet Martineau, *Society in America* (New York, 1837), I, 168.

16 Tuckerman, "Gleanings," *Appalachia* 14:382.

17 Frank H. Burt, "White Mountain Album," *Appalachia* 23: opp. 312 (June 1941).

18 Crawford, *History*, p. 159.

19 *Ibid.*, p. 176.

20 *Ibid.*, p. 174.

21 From unpublished portion of Crawford's *History*.

22 Frederick W. Kilbourne, "Thoreau and the White Mountains," *Appalachia* 14:358 ff. (June 1919).

23 Henry David Thoreau, "Thursday," in *A Week on the Concord and Merrimack Rivers* (New York, 1911), p. 392.

24 Kilbourne, "Thoreau," *Appalachia* 14:362, 363 (June 1919).

25 *Ibid.*, p. 366.

26 "Mount Washington in Early Days," letter from Joseph S. Hall of Frankfort, Mich., 4 August 1887, published in *Among the Clouds* 20 August 1887.

27 Charles T. Jackson, *First Annual Report on the Geology of the State of New Hampshire* (Concord, N. H., 1841), pp. 100, 101.

28 William Oakes, *Scenery of the White Mountains* (Boston, 1848), p. 4.

29 Kilbourne, *Chronicles*, pp. 207, 229, 230n.

30 Lucy Crawford, unpublished manuscript intended as a closing chapter to her *History of the White Mountains*, formerly in possession of her granddaughter, the late Miss Hattie B. Crawford of Lancaster, N. H.

31 According to Crawford, *History* (p. 25), Ethan was born in 1792, which would make him fifty-four at the time of his death.

32 Florence Morey, "Abel Crawford and His Mount Crawford House," *Appalachia*, June 1954, pp. 1–9.

33 One of my prized possessions is a copy of the first edition (1860) of *The White Hills*, onto the flyleaf of which is pasted a sheet torn from a memo book bearing, in the author's handwriting, the message:

April 5th, 1860
On Board for California!
Thomas Starr King

5 April was the day Starr King sailed from New York to Panama en route to California. The book, just published, was sent to the steamer by his publisher.

CHAPTER 4

1 For much of the information in this chapter I am indebted to the sons of George N. Cross for permission to use material from their father's book, *Dolly Copp and the Pioneers of the Glen* (Baltimore, Md., 1927, privately printed). For a novel based on the life of Dolly Copp and her family, see Anne Miller Downes, *The Pilgrim Soul* (Philadelphia and New York, 1952).

2 Willey, *Incidents*, p. 167.

3 Cross, *Dolly Copp*, p. 10.

4 *Ibid.*, p. 25.

5 "Hayes, Dolly Copp Monument near Gorham Dedicated," Manchester *New Hampshire Morning Union*, 31 August 1933.

CHAPTER 5

1 "John Frederick Kensett, 1816–1872," *Appalachia*, December 1947 pp. 447 ff.

2 Frederick Tuckerman, "The Golden Age of the White Hills," *Appalachia* 19:294 (February 1926).

3 Charles W. Wendte, *Thomas Starr King, Patriot and Preacher* (Boston, 1921), p. 42. See also Benjamin Champney, *60 Years Memories of Art and Artists* (1900).

4 John Greenleaf Whittier, "Mary Garvin," *The Complete Poetical Works of John Greenleaf Whittier* (Boston, 1894), p. 89.

5 *Ibid.*, "In the Crystal Hills," from "The Bridal of Pennacook," p. 23.

6 John H. Spaulding, *Historical Relics*, p. 73.

7 Interview with John H. Spaulding, *Among the Clouds* 14 August 1878.

8 Nathaniel Noyes was listed in the *Boston Directory of 1852* as "restaurator, 4 Water st., bds. 7 Prince."

9 Interview with Nathaniel Noyes in *Boston Herald*, reprinted in *Among the Clouds* 18 July 1900.

10 H.A.C., "An Early Visitor's Recollections," *Among the Clouds* 14 September 1878.

11 Henry Ward Beecher, "A Time at the White Mountains," *Eyes and Ears* (Boston, 1862), pp. 79–84.

12 See Kilbourne, *Chronicles*, pp. 305–307.

13 See Frank H. Burt, *Mount Washington, a Handbook for Travelers* (Boston, 1904), pp. 79, 80.

CHAPTER 6

1 Spaulding, *Historical Relics*, p. 77.

2 King, *White Hills*, pp. 343, 344.

3 Lewis Downing, Jr., to Henry M. Burt, 29 September 1898, letter published in *Among the Clouds, Carriage Road Edition* September 1899. Also see Willey, *Incidents*, p. 89.

4 *Ibid.*

5 B. F. Osgood to Frank H. Burt, 3 September 1899, unpublished letter.

6 Records of Mount Washington Road Company, 16 May 1857.

7 Letter from Osgood to Frank H. Burt, 3 September 1899.

8 Joseph S. Hall, letter in *Among the Clouds* 5 September 1887.

9 George W. Lane to Frank H. Burt, 7 September 1887, unpublished letter.

10 Letter to Portland *Eastern Argus* 7 August 1861.

11 Item in Boston *Advertiser* 9 August 1861.

12 Item in Portland *Eastern Argus* 10 August 1861.

13 Item in Boston *Advertiser* 9 August 1861.

14 Louisa M. Alcott, "A Visit to Mount Washington," *The Commonwealth* 7 August 1863.

15 Information from the late Charles Bingham, Littleton, N. H., formerly a resident of Allegan, Mich.

16 M. J. Keating, letter to *Among the Clouds* 20 July 1900.

17 Lewis Downing, Jr., to Frank H. Burt, letter printed in *Among the Clouds, Carriage Road Edition* September 1899, p. 8.

18 E. Libby & Sons Company to Frank H. Burt, 26 May 1906, unpublished letter.

CHAPTER 7

1 Sylvester Marsh, testimony before a committee of the United States Senate investigating the relations of capital and labor, sitting in Boston 22 October 1883.

2 Mrs. Mary Aiken Drake to the president of the Boston & Maine Railroad, 1 March 1927, unpublished letter.

3 Marsh's air-brake patent was No. 44,965, 8 November 1864, on "Apparatus for descending gradients," while the patent for that of George Westinghouse, Jr., was applied for in 1872 and granted in 1873. Marsh's only interest was in its use on his own railway, where it was soon given up, other devices having proved effective for safety. Other patents issued to Marsh in 1864 were No. 41,781, 1 March, "Apparatus for rendering lard," and No. 42,957, 31 May, "Grain Dryers," the latter possibly having some connection with "Marsh's Caloric Grain Meal," much advertised in that period.

The drawing attached to the air-brake patent shows an engine with horizontal boiler. To keep down the cost the trial engine was built with the boiler upright, hung upon trunions so as to be always nearly vertical. Four engines were built later of similar design, but all but one were later changed and horizontal boilers substituted. These three and all later locomotives have been built with two pairs of cylinders and two sets of driving wheels, thus doubling the power and greatly increasing safety.

4 While attempting to attract capital, Mr. Marsh for a time set up a model of the engine and track in a store window on Washington Street in Boston.

5 Sylvester Marsh, "Outline of the Building of the Mount Washington Railway," manuscript dictated by him, and preserved by his daughters. To this I am indebted for the material in this chapter with reference to Mr. Marsh.

6 "The Mount Washington Steam Railway Company," by "W," Boston *Journal* 30 August 1866.

7 Telegram in Boston *Journal* by "W" 30 August 1866.

8 "Opening of the Mount Washington Summit Railway," by "W," Boston *Journal* 31 August 1866, p. 1.

9 There is one record of an attempt by Sylvester Marsh to recoup his losses. On 9 January 1884, Senator Austin F. Pike, of New Hampshire, introduced into the United States Senate "A Bill for the Relief of Sylvester Marsh," to provide for an extension of his various patents in connection with the cog railway. On 28 January Anthony Pollock wrote to the Senator, enclosing the following (hitherto unpublished) statement by Mr. Marsh (now in the possession of the New Hampshire Historical Society, Concord):

> In the year 1859 I obtained a charter to build a railroad upon my improved method. [In 1861 I obtained a patent, and another in 1864.]
>
> I built many models, one quite small but complete steam engine. In 1866 by furnishing most of the money . . . I induced different Rail Roads each to risk a small amount.
>
> It has been in successful operation thirteen seasons, and carried 125,000 persons without injury to a single soul.
>
> I have never rec'd any remuneration from my patent, but think if I am granted an extension, that my prospects favor realization of something for my invention in years to come.
>
> . . . Two other Roads have been built, upon which my invention is used, viz: one up Green Mt., Maine, built only last season, and The Rigi Road in Switzerland, but having never applied for patents abroad, I can receive no remuneration from it.

10 "The President at the White Mountains," Boston *Journal* 28 August 1869.

11 Frank H. Burt, "Up the Mountain in the Buggy Age," *Boston Evening Transcript* 23 August 1937.

12 Testimony of Frank E. Brown, clerk of the Mount Washington Railway Company. Circuit Court of the United States, District of New Hampshire, In. Equity. Ebenezer S. Coe and David Pingree, Trustees, v. Walter Aiken, The Boston, Concord & Montreal Railroad Company, The Mount Washington Railway Company, and the Concord & Montreal Railroad Company, Pleadings and Evidence printed under the direction of the Clerk of the Court (Manchester, N. H., 1893), p. 295.

13 Josh Billings, *Spice Box* (pages not numbered).

14 Frank H. Burt, "An Almost Forgotten White Mountain Hotel," *Boston Sunday Globe* 4 July 1926. "Marsh-Field Name of New Station at Base," *The Littleton* (N. H.) *Courier* 9 December 1926.

15 Guy Roberts, *Old Peppersass—Her Invention and Life Story* (Whitefield, N. H., 1930).

16 "Joys of Cog Railroading," an interview with John Horne, *Boston Sunday Globe* 23 December 1906.

17 *Among the Clouds* 7 September 1882.

18 George H. Sargent, "Reviving the Summit House—A Two Million Mount Washington Improvement," *Boston Evening Transcript* 11 May 1912, Part 3, p. 2.

CHAPTER 8

1 "The Mt. Washington Search Light," *Electric World* 20 August 1892. See also John W. Hammond, *Men and Volts* (New York, 1941), p. 202. Mrs. Archer W. Ives, whose husband was in charge of the installation of the searchlight, wrote to the author under date of 25 August 1948: "Mr. Lewis H. Rogers did not design the searchlight. That was done by the engineers of the Thomson-Houston Company. It was his suggestion but not design." Mrs. Ives wrote on 30 August 1948: "Arch wants me to tell you that there was a low tower on the mountain used by the Weather Bureau, and he had it built high enough to clear the other buildings so the light might be seen on all sides." See *Among the Clouds* 17 August 1892; and "Mt. Washington Search Light," *Among the Clouds* 9 August 1892.

In 1893 it was on exhibition at the World's Columbian Exposition in Chicago. In 1894 the searchlight, then belonging to the Pacific Electric Company, was taken to the West Coast, and was set up on Echo Mountain on the approaches to Mount Lowe in Southern California. It has often been referred to since that time as the Mount Lowe Searchlight, although, ac-

cording to the United States Forest Service, there has never been a searchlight on Mount Lowe.

Robert W. Jackson of the General Electric Company, after considerable research in relation to the searchlight, wrote from San Francisco to the author: "It was taken to the West Coast and placed on Echo Mountain where it stayed until a fire in 1937 destroyed the Pacific Electric facilities on Echo Mountain. The P. E. crew went up to take down the searchlight after this fire, and found it had already been destroyed by marauding children" (unpublished letter, 7 June 1951).

This was an appropriate spot for the Mount Washington searchlight to end its days. Mount Lowe in the Sierra Madre Mountains was named for the famous scientist and inventor, Thaddeus S. O. Lowe, who was born in Jefferson, N. H., in 1832, almost at the foot of the Presidential Range, and was a relative of the popular White Mountain guides of the same name. He built the railway up Mount Lowe in 1891–94, and established the observatory on its summit. He died in Pasadena, Calif., in 1913.

2 See chap. 2, n. 34.

CHAPTER 9

1 For the first and second years the name of *Among the Clouds* was displayed in large Old English type. From 1879 to 1884 a banner head drawn by an artist long since forgotten was used. The banner head from 1885 was designed by Frank H. Shapleigh, a prominent Boston artist (see page 117). This presents an outline sketch of the Presidential Range as seen from Bretton Woods.

2 Henry M. Burt, *Burt's Guide through the Connecticut Valley to the White Mountains and the River Saguenay* (Springfield, Mass., 1874).

3 Frank H. Burt, "*Among the Clouds*," *Appalachia* 22:163 (December 1938).

4 *Boston Evening Transcript* (date lost).

5 "Acknowledgments," printed as a preface to the bound volume of *Among the Clouds* 1 (1877).

6 Kilbourne, *Chronicles*, p. 252.

7 Interview with P. T. Barnum, *Among the Clouds* 4 August 1887.

8 *Among the Clouds* 21 July 1877.

9 Ed. J. Mehan, "Mr. Burt's Mishap in Tuckerman's Ravine," *Among the Clouds* 14 July 1899.

10 Burt, "*Among the Clouds*," *Appalachia* 22:172 (December 1938).

11 *Ibid.*, pp. 170, 171.

12 "Burt's Ravine," Lancaster *Gazette* 14 August 1901.

13 Levi Paulsen, Cascade, N. H., to Frank H. Burt, 19 March 1944,

unpublished letter. For the information in this chapter about the Fire of 1908 I am indebted to the series of articles under the general title "The Fire on Mount Washington" appearing in the Magazine Number of *Among the Clouds*, Season of 1908.

CHAPTER 10

1 C. H. Hitchcock et al., *Mount Washington in Winter*, Boston, 1871, p. 222.

2 Trails above timber line are generally marked by cairns, or piles of stones, set at regular intervals. The first recorded use of cairns was prior to 1833, as reported in Lucy Crawford's *History*, p. 156: "a young Vermonter with some others . . . [had spent the night at Ethan Crawford's camp] and early in the morning set out to climb [Mount Washington]. . . . There came on a thick mist of rain . . . but he . . . determined to go on, and for fear he should lose his way when he should come back, laid up piles of stones . . . at proper distances from each other . . . which . . . have been of use to many, who were like himself, determined to pursue after they had undertaken it. . . . Such was the spirit of a Vermonter."

In the 1930s, during the days of the Civilian Conservation Corps, or "CCC," the boys rebuilt all cairns tall enough to stand above the deepest probable snowfall. The U. S. Forest Service has since then taken over the care of the trails and preservation of the cairns.

3 John Mason Potter, "Climbers Spend Night at Lakes of Clouds Hut —and Talk of Goofers," *Boston Sunday Globe* 21 July 1946, p. A–5.

4 Material about Strickland in this chapter is from Frank H. Burt, "First to Die on Mount Washington," *Appalachia* June 1936.

5 The following complete list of climbing and skiing fatalities on and near Mount Washington is taken from Mount Washington observatory *News Bulletin*, No. 25 (December 1954), except as noted:

1. Frederick Strickland, age 29, of Bridlington, England, died of exposure and freezing 19 Oct. 1849 in the Ammonoosuc Ravine after losing his way down the mountain on the Fabyan Path after a severe early snowstorm.
2. Lizzie Greene Bourne, age 23, of Kennebunk, Maine, died 14 Sept. 1855 of exhaustion and exposure, almost at the summit after an ascent in stormy weather by the Glen House Bridle Path.
3. Benjamin Chandler, age 75, of Wilmington, Delaware, died 7 Aug. 1856 of exhaustion and exposure near the summit after an ascent late in the afternoon by the Glen House Bridle Path.
4. Harry W. Hunter, age 21, of Pittsburgh, Pa., died 3 Sept. 1874 near the foot of the cone of the mountain, of exhaustion and exposure, during an ascent by the Crawford Path in cold and rain.

5. Sewall E. Faunce, age 15, of Dorchester, Mass., was killed 24 July 1886 by the falling of the snow arch in Tuckerman Ravine.
6. Ewald Weiss, age 24, of Berlin, Germany, left the Summit House 24 Aug. 1890 to walk to Mt. Adams. He has never been found.
7. William B. Curtis, age 63, of New York, N. Y., died 30 June 1900 of exhaustion and exposure on the Crawford path not far from the present Lakes of the Clouds Hut. One of the founders of the New York Athletic Club, and known as the "Father of Athletics" in America, Curtis, with his friend Ormsbee, left Crawfords on a warm, sunny afternoon to run into the worst ice storm, lasting sixty hours, ever known at this season.
8. Allan Ormsbee, age 28, of Brooklyn, N. Y., died 30 June 1900 of exhaustion and exposure, a few hundred feet from the summit.
9. John M. Keenan, age 18, of Charlestown, Mass., a surveyor, wandered off the cone of the mountain 18 Sept. 1912 and has never been found.
10. Herbert J. Young, age 18, of Salem, Mo., died 1 Dec. 1928 of exhaustion and exposure on the Ammonoosuc Ravine Trail, after ascending through Tuckerman Ravine.
11. Henry B. Bigelow, Jr., age 19, of Cambridge, Mass., was killed by a falling stone 16 Sept. 1931 while rock climbing in Huntington Ravine. *Appalachia* 25:478 (December 1931).
12. Ernest W. McAdams, age 22, of Stoneham, Mass., froze to death 31 Jan. 1932 near the Lizzie Bourne monument while making a winter ascent by the cog railway route.
13. Joseph B. Chadwick, age 22, of Woburn, Mass., froze to death in the same storm 31 Jan. 1932 very near the summit, while ascending by the cog railway. (For both these fatalities see *Appalachia* 25:143, June 1932.)
14. Simon Joseph, age 19, of Brookline, Mass., died 18 June 1933 of exhaustion and exposure on the Crawford path near the Lakes of the Clouds hut.
15. Rupert Marden, age 21, of Brookline, Mass., died 11 Nov. 1933 of exhaustion and exposure in Tuckerman Ravine after a climb in a snowstorm on Lion Head Trail.
16. John W. Fowler, age 19, a Princeton student, of New York, N. Y., died 1 April 1936 from injuries suffered in a 900-foot slide down the icy cone on the east side of the mountain.
17. Grace M. Sturgess, age 24, of Williamstown, Mass., died 23 May 1936 as a result of injuries from falling ice in Tuckerman Ravine.
18. Harry D. Wheeler, age 55, of Salem, Mass., died 4 July 1937 from a heart attack while climbing the Ridge of Caps Trail on Mount Jefferson. See "Deaths and Accidents," *Appalachia* 22:117 (June 1938).
19. Joseph Caggiano, age 22, of Astoria, N. Y., died 24 Aug. 1938 of exhaustion and exposure on the Gulfside Trail near Madison hut after crossing the range from Mt. Washington.

20. Edwin P. McIntire, Jr., age 19, of Short Hills, N. J., was killed 9 June 1940 by a fall into a crevasse in Tuckerman Ravine.
21. Louis Carl Haberland, age 26, of Roslindale, Mass., died 13 Oct. 1941 of exposure and exhaustion in a northerly sleet storm on Ridge of Caps Trail.
22. John Neal, of Springfield, Mass., was fatally injured 7 April 1943 while skiing on the Little Headwall, Tuckerman Ravine. *Appalachia* 24:409 (June 1943).
23. Phyllis Wilbur, age 16, of Kingfield, Maine, injured in skiing accident in Tuckerman Ravine 31 May 1948, died in North Conway Hospital on 3 June 1948.
24. Dr. Paul H. Schiller, of Cambridge, Mass., was killed 1 May 1949 by falling into a crevasse while skiing on the headwall of Tuckerman Ravine.
25. Tor Staver, injured 2 Feb. 1952 in a skiing accident on the John Sherburne Trail leading from Tuckerman Ravine to Pinkham Notch, died in Boston, Mass., 5 Feb. 1952.
26. Raymond W. Davis, age 50, of Sharon, Mass., died from exposure and heart failure 23 Aug. 1952 after collapsing above the headwall of Tuckerman Ravine.
27. Philip Longnecker, age 25, of Toledo, Ohio, froze to death during Tuckerman Ravine camping trip 31 Jan. 1954. (For details of this and the following fatality, see *Appalachia* 30:104, 105, June 1954.)
28. Jacques Parysko, age 23, of Cambridge, Mass., froze to death during Tuckerman Ravine camping trip 31 Jan. 1954.
29. Dr. A. Aaron Leve, age 28, professor at Northeastern University, Boston, Mass., killed by avalanche in Tuckerman Ravine, 19 Feb. 1956. *Boston Herald* 20 Feb. 1956; *Manchester* (N. H.) *Union Leader* 20 and 28 Feb. 1956.
30. John J. Ochab, age 37, of Newark, N. J., 1 Sept. 1956, from fall on Mt. Clay. (This and the following fatalities from list compiled by Appalachian Mountain Club.)
31. Thomas Flint, age 21, of Concord, Mass., died on 2 June 1957 from fall and exposure on Mt. Madison.
32. William Brigham, age 23, of Montreal, Canada, killed by ice fall in Tuckerman Ravine on 17 May 1958.
33. Betty J. March, age 17, of Dorchester, Mass., died of exposure 19 July 1958 on Crawford path one-fourth mile below the summit (*Boston Herald* 21 July 1958, for this and the following).
34. Paul Zanet, age 24, of Brookline, Mass., died of exposure 19 July 1958 on Crawford path one-fourth mile below the summit.

For further details on casualties see Kilbourne, *Chronicles*, pp. 267 ff.

6 *A.M.C. White Mountain Guide*, 16th ed. (Boston, 1960), p. 1.

7 See Dr. B. L. Ball, *Three Days on the White Mountains* (Boston, 1856), for the complete story.

8 "Couple Escape Death on Mt. Washington; Both Are Seriously Injured in 300-Foot Fall," *Boston Herald* 4 Jan. 1933.

9 Hal Burton, "The Mayor of Porky Gulch," *Saturday Evening Post* 19 Mar. 1949, p. 147.

10 One present-day help in emergencies, especially in the case of ski accidents, is the line of telephones on the John Sherburne Ski Trail, extended to what is known as Lunch Rocks near the Snow Arch in Tuckerman Ravine. These emergency telephones and the lines are maintained by the Mount Washington Volunteer Ski Patrol, and they are connected with the Tuckerman Ravine Shelter (built in 1952 on the foundation of one that was burned) and the Pinkham Notch Camp, where there are always crews who may respond to a call for help.

The Harvard Mountaineering Cabin is located approximately one and a half miles from Pinkham Notch Camp up the Sherburne Trail on the shoulder of Boott Spur. (Information for this reference is from Joseph B. Dodge in unpublished letter to F. Allen Burt 16 July 1955.)

11 See Donald R. Waugh, "Joe Dodge has made White Mountains Safe and Comfortable for Thousands of Climbers," *Boston Evening Transcript* 15 July 1933.

CHAPTER 11

1 "Skiing on Mount Washington: Norman Libby First to Try," Gorham *Mountaineer* 22 February 1905.

2 Norman Libby, "A Ski Trip up Mount Washington," *Among the Clouds* 17 July 1907.

3 *Dartmouth Outing Club Handbook* (Hanover, 1932), pp. 5, 6.

4 Robert S. Monahan to F. Allen Burt, 26 February 1948, unpublished letter.

5 John P. Carleton to F. Allen Burt, 1 April 1948, unpublished letter.

6 "New Trail Used for First Time on Skis," *The Berlin Reporter* 7 January 1932.

7 "Ski Racers Face Death on Mountain," *Boston Post* 21 March 1932, p. 1.

8 Winston Pote to F. Allen Burt, 26 February 1948, unpublished letter.

9 Gwendoline Keene, "Skiing Begins at Easter—Spring Skiing in a World Apart," *Boston Evening Transcript* 15 April 1933.

10 "Meet Your Ski School," Sun Valley *The Valley Sun* 22 January 1948.

11 Winston Pote to F. Allen Burt, 26 February 1948, unpublished letter.

12 Wilson MacDonald, "Song of the Ski," in *Out of the Wilderness.* Quoted in *New Hampshire Troubadour* January 1949.

CHAPTER 12

1 Spaulding, *Historical Relics*, pp. 97, 98 (see chap. 2, n. 56).

2 *Among the Clouds* 19 August 1904.

3 "Wheels and Autos," *Among the Clouds* 26 July 1905; "Tidbits from *Among the Clouds*" 1877–86, *Appalachia* 23:58–71 (June 1940).

4 Feature articles in *Boston Sunday Herald* 26 July 1937.

5 Bridgton *News* 22 June 1877. This seems to be the first record of a marriage on the summit of Mount Washington, although two other claimants for this distinction have appeared. See *Among the Clouds* 11 September 1916, and "Married on Top of Mt. Washington," *The Berlin Reporter* 10 August 1933.

6 Paraphrased from George N. Cross, *Dolly Copp* (chap. 4, n. 1), p. 28.

7 Frank H. Burt, "Mt. Washington Bowed to Auto 40 Years Ago," *Christian Science Monitor* 31 August 1939.

8 *Among the Clouds* 13 July 1904.

9 "End of the Climb," *Among the Clouds* 19 July 1905.

10 "Up Mt. Washington in High Gear," *Boston Herald* 2 July 1933.

11 "Hudson Car Climbs Mt. Washington in 13 Minutes, 20 Seconds for Record," *Boston Herald* 4 July 1934.

12 R. J. Buckman, "Cambridge Man Smashes all Records in Dash up Mt. Washington Toll Road," *The Berlin Reporter* 18 July 1935.

13 "Ladd Wins Summit Race," *The Berlin Reporter* 29 August 1940.

14 "Jaguar Wins Climb up Mt. Washington," *Manchester Union-Leader* 17 August 1953.

15 Editorial, Manchester *New Hampshire Morning Union* 2 September 1947.

16 *Boston Herald* 21 September 1947.

CHAPTER 13

1 All quotations in this chapter referring to Arthur Walden's ascent of Mount Washington from W. A. Macdonald, "Chinook Writes of History in Ice of Mt. Washington," *Boston Evening Transcript* 31 March 1926, part 2, pp. 1, 14. Mr. Macdonald's readers will find that his modesty, coupled to the prevailing newspaper practice of that era, prevented his mentioning his part in the enterprise save with the phrase "Another man" did so-and-so. In each instance, the "other" man was the writer himself.

2 All information regarding Mrs. Clark's ascents was secured through an interview with her at her home in North Woodstock, N. H.

3 W. A. Macdonald, "Norman Vaughan Answers a Call," *Boston Evening Transcript* 5 February 1932. Also 6 February 1932.

CHAPTER 14

1 "Mt. Washington cog railroad trains pass," *Littleton Courier* 10 July 1941.

2 Acts and Resolves of the Legislature of New Hampshire, 1831, vol. XXVIII, chap. 18, p. 34; and minutes of the meeting of the Governor and Council 1 July 1831.

3 Data on the ownership of Mount Washington is from Frank H. Burt, *Mount Washington*, pp. 90, 91; and Arthur E. Bent, "Ownership of Mount Washington," *Mount Washington Observatory News Bulletin* No. 23 (December 1953), pp. 1–3.

4 Total cost of building the Summit House was $69,599.57. Coe and Pingree v. Walter Aiken et al. (see chap. 7, n. 12), p. 300.

5 *Ibid.*

CHAPTER 15

1 Antevs, *Alpine Zone*, p. vii.

2 Robert F. Griggs, "Timber Line on Mount Washington," *The New England Naturalist* 8:12 (September 1940).

3 Robert S. Monahan, "Timber Line," *Appalachia* 19:403 (June 1933).

4 Alfred K. Chittenden, *Forest Conditions of Northern New Hampshire*, U. S. Dept. of Agriculture, Bureau of Forestry, Bull. 55 (Washington, 1905), pp. 30–32.

5 Manuscript of Dr. Manasseh Cutler, quoted in Belknap, *History*, III, p. 44 n.

6 Sir John William Dawson, *Alpine and Arctic Plants*, a lecture delivered before the Y.M.C.A. of Montreal, Canada, February 1862 (Montreal, 1862).

7 Griggs, "Timber Line," p. 12.

8 John W. Harshberger, "Alpine Fell-fields of Eastern North America," *Geogr. Review*, vol. 7 (1919), p. 233–55; *A Comparison of the Alpine Regions and Vegetations of Eastern North America, Norway and Switzerland* (Zurich, 1925).

9 About the turn of the century some enthusiast set out a croquet court on Monticello Lawn. Scores of climbers paused there to play "the highest game of croquet east of the Rocky Mountains."

10 Monahan, "Timber Line," p. 410.

11 M. L. Fernald, "Persistence of Plants in Unglaciated Areas of Boreal America," *Memoirs Amer. Acad. of Arts & Sciences* (Boston, 1925), vol. 15, no. 3, 237–342. B. L. Robinson and M. L. Fernald, *Gray's New Manual of Botany*, 7th ed. (New York, 1908).

12 A. S. Pease, "Vascular Flora of Coos County, New Hampshire," *Proceedings Boston Society of Natural History* vol. 37 (1924), no. 3; Mrs. Albion D. Wilde, "A List of Most of the Plants to be Found in the Alpine and Subalpine Regions of Mt. Washington and the Great Range," *Appalachia* 15:211–214 (1921); S. K. Harris, "Some Characteristic Plants of Mount Washington," *Bulletin Boston Society of Natural History* 55:5–11 (April 1930); H. N. Moldenke, "A Trip to the White Mountains of New England," *Torreya* 31:161–168 (1931); and W. H. Stone, "The Flora of Mt. Monadnock," *Appalachia* 4:145–150 (1885).

13 This and the following quotations from Antevs, *Alpine Zone*, pp. 80–84.

14 See account of Darby Field's ascent, chap. 2, n. 2.

15 Belknap, *History of New Hampshire*, II, 41.

16 Jacob Bigelow in *New England Journal of Medicine and Surgery*, vol. 5 (November 1816).

17 "Protect, traveler, whom the lightnings spare, this fragile monument. Lemuel Shaw, Nathaniel Tucker, Jacob Bigelow, Francis C. Gray, and Francis Boott, of Boston, on the second day of July A.D. 1816, Mount Agiocochook having been surmounted, have left this here."

18 Asa Gray, "Memoir of William Oakes," *American Journal of Science and Arts* (January 1849).

19 Tuckerman, "The Golden Age," *Appalachia* 19:292 (February 1926).

20 Kilbourne, *Chronicles*, p. 37 n.

21 King, *The White Hills*, p. 46.

22 Crawford, *History*, 2d ed., pp. 121, 122.

23 See Edward Tuckerman, "The Vegetation of the White Mountains," in King, *The White Hills*, pp. 230 ff.

24 Samuel Taylor Coleridge, "Hymn Before Sun-Rise in the Vale of Chamouni," *The Poetical Works of S. T. Coleridge* (New York, Thomas Y. Crowell & Co.), p. 169.

25 Antevs, *Alpine Zone*, p. 98.

26 Gerrit S. Miller, "On a Collection of Small Mammals from the New Hampshire Mountains," *Proceedings Boston Society of Natural History* 26:177–197 (1894). Antevs, *Alpine Zone*, p. 99.

27 Miller, "Small Mammals," p. 179.

28 A. H. Bent, "Animal Life in the White Mountains," *Appalachia* 13:351 (1915).

29 Bradford Torrey, *Nature's Invitation* (Boston and New York, 1904), p. 41.

30 Bent, "Animal Life," p. 351.

31 J. H. Emerton, "Geographical Distribution of Spiders in New England," *Appalachia* 13:143, 156, 157 (1914). See also Antevs, *Alpine Zone*, p. 100.

32 Annie T. Slosson, "List of Insects Taken in Alpine Region of Mount Washington," *Entomological News* 5:1–6 (1894); 6:4–7, 316–321 (1895); 7:262–265 (1896); 8:237–240 (1897); 9:251–253 (1898); 11:319–323 (1900); 13:4–8 (1902); 17:323–326 (1906). In *Among the Clouds* (21 July 1894) Mrs. Slosson reports that she had contributed to the *Entomological News* a list of 300 insects found at or above 5500 feet altitude on Mount Washington, including several new species.

33 See Samuel H. Scudder, *Frail Children of the Air. Excursions into the World of Butterflies* (Boston and New York, 1895), pp. 71 ff.

34 Antevs, *Alpine Zone*, p. 101. See also F. Gardiner, "Coleoptera of the White Mountains," *Psyche* 2:211–213 (1879); R. F. Scharff, *Distribution and Origin of Life in America* (New York, 1912), pp. 36, 37; and C. W. Johnson, "The Insects of Mt. Washington," in *Mount Washington and Thereabouts*, pamphlet issued by Boston & Maine Railroad.

35 "The Mount Washington Butterfly," *Among the Clouds* July 1892, No. 2.

36 S. C. Carpenter, "Protection of Chinobas Semidea," *Entomological News* (June 1901).

37 Annie Trumbull Slosson, "Protection of Chinobas Semidea," *Among the Clouds* 1 August 1901, p. 4.

38 *Among the Clouds* 21 July 1894.

39 Crawford, *History*, p. 80.

40 E. W. Nelson, *Wild Animals of North America* (1918), quoted in *Dartmouth Outing Club Handbook* (Hanover, N. H., 1932), p. 69.

41 "Great Gulf Wild Area," *Appalachia* 26:7 (June 1960), p. 126.

42 The register of the Granite House, an old-time hotel in Littleton, N. H., for the years 1842–50, shows on 30 July 1849 the arrival of the following party, nearly all of whom were members of the faculty of Harvard College and pursuing scientific study of the White Mountains: Louis Agassiz and his thirteen-year-old son Alexander; Arnold Guyot, then lecturing at Harvard; Benjamin Peirce, professor of mathematics and astronomy; C. C. Felton, afterwards president of the college; George P. Bond, then connected with the Harvard Observatory and author of one of the first maps of the White Mountains; Ernest Sandos, Franklin E. Felton, and S.

M. Felton. On 2 August there are again registered Agassiz, father and son, the three Feltons, Peirce, and Bond, and also W. W. Gould of Boston. Other scientists who visited the White Mountains during the forties included Oliver Payson Hubbard, J. Peter Lesley, Sir Charles Lyell, and the Rogers brothers. Guyot studied the geological age of the White Mountains, their glacial phenomena, and other geological and geographical data.

CHAPTER 16

1 Hitchcock, et al., *Mount Washington in Winter*, pp. 184, 185.

2 Paraphrased from Reg Abbott, "Mt. Washington Observers Endure Storms Far Worse than '88 Blizzard," Manchester *New Hampshire Morning Union* 22 May 1947.

3 Hitchcock, *Mount Washington in Winter*, p. 10.

4 *Ibid.*, p. 21.

5 *Ibid.*, p. 107.

6 *Ibid.*, pp. 109, 110.

7 *Ibid.*, p. 148.

8 *Ibid.*, p. 172.

9 *Ibid.*, p. 243.

10 Burt, *Mount Washington*, p. 30.

11 This and following quotations from Edward L. Wilson, "Winter Ascent of Mt. Washington," *Among the Clouds* 5 September 1891, quoted from an article in *Scribner's Magazine*. Mr. Wilson was editor of the Philadelphia *Photographer*.

12 Data from Burt, *Mount Washington*, p. 82.

13 Spaulding, *Historical Relics*, pp. 92, 93.

14 Hitchcock, *Mount Washington in Winter*, pp. 355, 356.

15 *Among the Clouds* 8 September 1877, p. 4. "J.H." was John Horne, Superintendent of the Mount Washington Railway.

CHAPTER 17

1 Robert S. Monahan, *Mount Washington Reoccupied* (Brattleboro, Vt., 1933), pp. 7, 8.

2 Antevs, *Alpine Zone*, p. viii.

3 Monahan, *Mount Washington Reoccupied*, p. 13.

4 Dana Tiverton, "Scientists Dig in for Winter on Mt. Washington,"

Boston Herald 13 November 1932. See also W. A. Macdonald, article in *Boston Evening Transcript* 22 October 1932.

5 Monahan, *Mount Washington Reoccupied*, p. 24.

6 *Ibid.*, p. 38.

7 *Ibid.*, p. 104.

8 Charles F. Brooks, "The Mount Washington Observatory," reprinted from *Transactions of the American Geophysical Union, Fourteenth Annual Meeting*, 1933.

9 Charles F. Brooks, "Wind of 231-Mile Velocity Recorded in New Hampshire," reprinted from *Engineering News-Record* 10 May 1934.

10 *Ibid.*

11 "Wind and Rain Set Records in Two-Day Gale," *The Berlin Reporter* 19 April 1934, p. 1.

12 Charles F. Brooks, "New Mount Washington Observatory Can Stand 200-Mile-an-Hour Wind," *Boston Evening Transcript* 20 November 1937, part 5.

13 *Ibid.*

14 Reg Abbott, "Mountain-Top Observatory Crew Engaged in Large-Scale Research," Manchester *New Hampshire Morning Union* 24 May 1947.

15 "Observatory Roll Call," Mount Washington observatory *News Bulletin*, No. 17 (July 1949), p. 2.

CHAPTER 18

1 "Well on Top of Mt. Washington Required Skillful Work," *Christian Science Monitor* 6 September 1941, p. 2.

2 The original call was W39B. This was later changed to WMNE, which was used until the station was closed in 1948.

CHAPTER 19

1 Victor F. Clark, "The War Years on Mount Washington," *Appalachia* 26:95 (June 1946).

2 "14 Army Nurses 'Camp Out' on Mount Washington," Manchester *New Hampshire Morning Union* 23 September 1945.

3 Clark, "War Years," p. 100.

4 Reg Abbott, "Mt. Washington Scientists Cause Snow; Weather Control Foreseen," Manchester *New Hampshire Morning Union*, 21 May 1947, pp. 1, 27.

5 Vincent J. Schaefer, "Experimental Studies of Snow and Supercooled Clouds on Mount Washington," Mount Washington observatory *News Bulletin*, June 1947, p. 1.

CHAPTER 20

1 Reg H. Abbott, "Research on Mt. Washington Has Furnished Data Vital for Aviation," Manchester *New Hampshire Morning Union* 29 March 1947, pp. 1, 3.

2 Abbott, "Radar Acts as Eyes for Air Research Crew Over Mt. Washington," Manchester *New Hampshire Morning Union* 24 December 1947.

3 *Ibid.*

4 Abbott, "Reporter Finds Plane Flight to Top of Mt. Washington Safe, Practical," Manchester *New Hampshire Morning Union* 25 March 1947.

5 *Ibid.*

6 Carmen A. Onofrio to F. Allen Burt, 1 March 1948, unpublished letter.

7 Abbott, "Reporter Finds Plane Flight to Top of Mt. Washington Safe, Practical," Manchester *New Hampshire Morning Union* 25 March 1947.

8 Abbott, "Save Broken Prop Memento of Mt. Washington Thriller," Manchester *New Hampshire Morning Union* 23 October 1947.

9 Edward M. Benham to F. Allen Burt 5 October 1948, unpublished letter.

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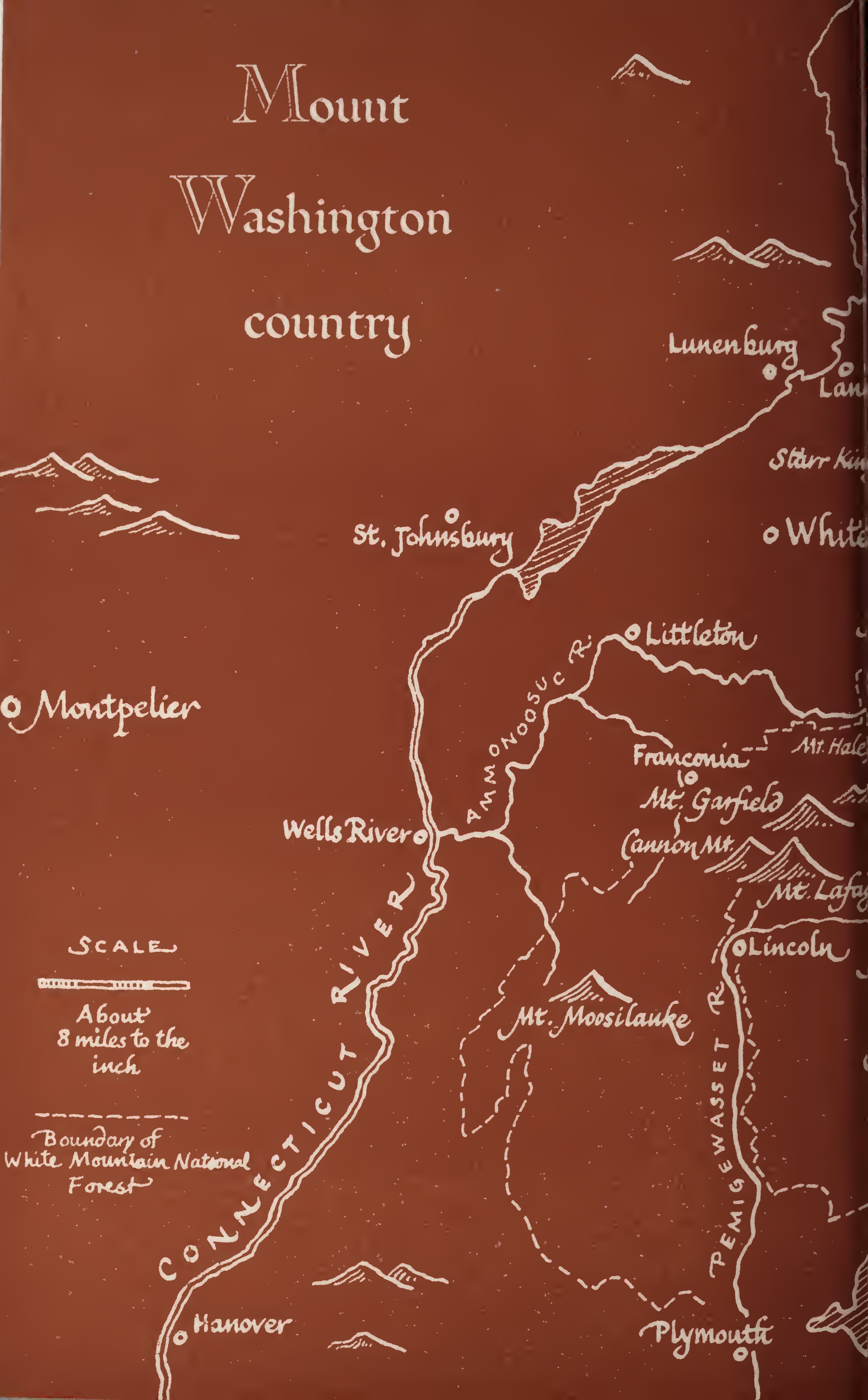
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Mount Washington country



Umbagog Lake

N

Berlin

Gorham

ANDROSCOGGIN RIVER

Bethel

Mt. Madison

Mt. Adams

Jefferson

Mount Washington

Carter Dome

Mt. Franklin

Mt. Monroe

Mt. Clinton

Mt. Jackson

Mt. Willey

Mt. Crawford

North Conway

Bear Mt.

Conway

Conway Lake

Long Lak

Sebag

SACO RIVER

Ossipee Lake

Squam Lake